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A Comprehensive Data Processing Plan for Crop Calendar MSS Signature Development from Satellite Imagery

> Second Progress Report April 1976

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APR 15 1976 SIS/902.6



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Technical Report 286-2

1 April 1976

R. M. Haralick

N76-24663

unclas

(E76-10343) A COMPRESENSIVE DATA PROCESSING PLAN FOR CROP CALENTAR MSS SIGNATURE DEVELOPMENT FROM SATELLITE INAGERY Progress

CSCL 05B G3/43 00343 . Report (Kansas Univ.)

Original photography may be purchased from: **EROS Data Center** 10th and Dakota Avenue Sioux Falls, SD 57198

Funded by:

Goddard Space Flight Center Contract # NAS 5-20943 Greenbelt, Maryland 20771

1.0 INTRODUCTION

Preliminary analysis of a few of the LACIE test sites shows poor to fair classification accuracy using the NASA supplied ground truth. A detailed accounting of errors indicated that most of the errors occurred on field boundaries. This implies that there is some misregistration of the temporal band congruencing done by NASA. An experiment which flickered one band from one date with the same band from the next date showed as much as a two to three resolution cell error in spatial registration. During our next quarter of work, we will try to re-register those dates having worst registration.

An extensive set of experiments with the Rice County test site yielded about the same results using:

- (1) raw LANDSAT data
- (2) ratioed LANDSAT data or
- (3) LANDSAT data with soil type regressed out.

We did find, however, that if we take combined soil type and crop type for categories, then the resulting probability distributions seem to be more unimodal.

On the more positive side we found that spatial post processing of the classified image can increase identification accuracy and that a spatial clustering of the imagery tends to make much cleaner classified images.

During the next quarter of work we will do a detailed study of the clustered images and relate each cluster to the soil type, weather, crop type based on KANSAS crop calendars and manual interpretation of the LANDSAT imagery, and the NASA supplied ground truth. We as other investigators, such as those in the Institute for Space Studies, feel there are errors in the NASA supplied ground truth. By doing a cluster analysis preceeding the spectral-temporal signature identification there will be a better correspondence between the classification results and the crop type and condition really occuring on the ground.

Section 2 describes the preliminary analysis using a 10% sample of the data. Section 3 describes the initial table look-up processing of four of the five test sites and Section 4 describes the initial spatial clustering done on four of the five test sites. The appendices assemble data on the test sites as well as some of the detailed results of the preliminary analysis.

2.0 RESULTS FROM STATISTICAL PROGRAMS

In this section we will give a brief summary of the results obtained using some standard statistical programs on the crop inventory project. There are five LACIE sites, all in Kansas, involved in this study (see Appendix A1 for coordinates). Of the five sites involved we have chosen three, Rice county, Morton county and Saline county, to put through a preliminary analysis. Rice county has been analyzed in some detail and the results will be discussed in the body of this section.

2.1 Preparing Data for Analysis

We received a tape for each study site, from NASA, which contained the ERTS images for that site from a number of dates in the 1973-1974 crop year. These images had already been registered by NASA. The images on these tapes were then converted to the proper format to use by the KANDIDATS system on the PDP-15 by Gary Minden. It was then necessary to find that portion of the image that just covered the study site.

In order to find the study sites on the image it was necessary to use black and white transparencies of the whole ERTS frame containing the study site. First the study site was found on the transparency with the band that gave the best contrast. This was done by locating landmarks on maps of the area and then finding them on the transparency. The area of the study site would then be marked off in grease marker on the transparency. After locating the study site on the transparency, sections of the image stored on discpacks on the PDP-15 would be placed out on the IDECS television display using the KANDIDATS package of image processing routines. Then features on the marked off area on the transparency would be searched for on the TV image. By this method the section of the image containing the study site was found and a subimage containing the study site was created for further manipulation.

After finding the study site on the digital image stored on the disc, it was necessary to overlay the ground truth. Since there were only two bands of ground truth (crop type and soil type), these were manipulated to fit the ERTS image patterns. It was necessary to rotate and slightly distort the ground truth to

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overlay the ERTS images. ¹ This was done by trial and error, visually on the IDECS, using the KANDIDATS package on the PDP-15 to compute the rotations and distortions. Appendices B, C, and D contain the details of the rotations and distortions of Rice, Morton, and Saline counties respectively.

With the ground truth bands and the ERTS images registered, it was possible to take samples of the images. Initially random samples of about 10% of the observation vectors were taken. These were written out, in their raw form on a tape in a format compatible with the Honeywell 600 series computer (actually in Honeywell system standard format). The sample of observation vectors was then sorted by a program written in FORTRAN 6000 into groups on the basis of crop type. This set of sorted vectors could be written out on a time share file for analysis by time share programs, or punched on cards or written onto tape, for analysis by batch processing (all on the Honeywell 635).

2.2 Types of Analysis Used

Three different packages have been used to date and the use of a fourth is planned. The BMDP package (Dixon, 1975), the KANDIDATS package (Johnson, 1973), and a package of time sharing programs developed by Peter Neely at the KUCC have been used.

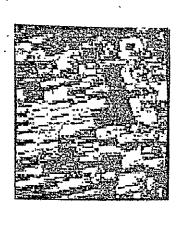
The programs used were BMDP9D, a general data describing program, BMDP7M, a discriminant analysis program (Dixon, 1975); REGRESS, a step wise regression program, CANCORR, a canonical correlation program, PRINCOMP, a principal components analysis, (Neely 1973–1974); and various routines in the KANDIDATS package.

2.3 Results

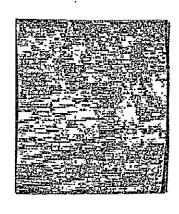
Intensive analysis has been carried out on the Rice county site.

Figures 2.1a - 2.1d show the four original ERTS bands, for the four dates over the Rice county test site. Initially the BMDP7M discriminant analysis program was used on the raw data. The control cards, and selected parts of the results

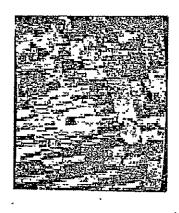
Ground truth data for the LACIE sites have been congruenced to the MSS CCT by the following procedure. The ground truth image was rotated by 16-18° in a counter-clockwise direction and the upper left corner was "stretched" upward and to the left. The centroid of rotation is irrelevant since the ground truth data was later translated to fit the image data. "Stretching" was required to obtain a better bit between the ground truth and image data. Parameters for each site are given in the appendices.

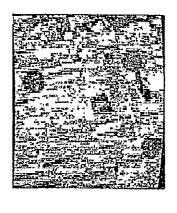


MSS BAND 4



MSS BAND 5

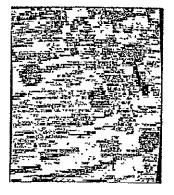




MSS BAND 6

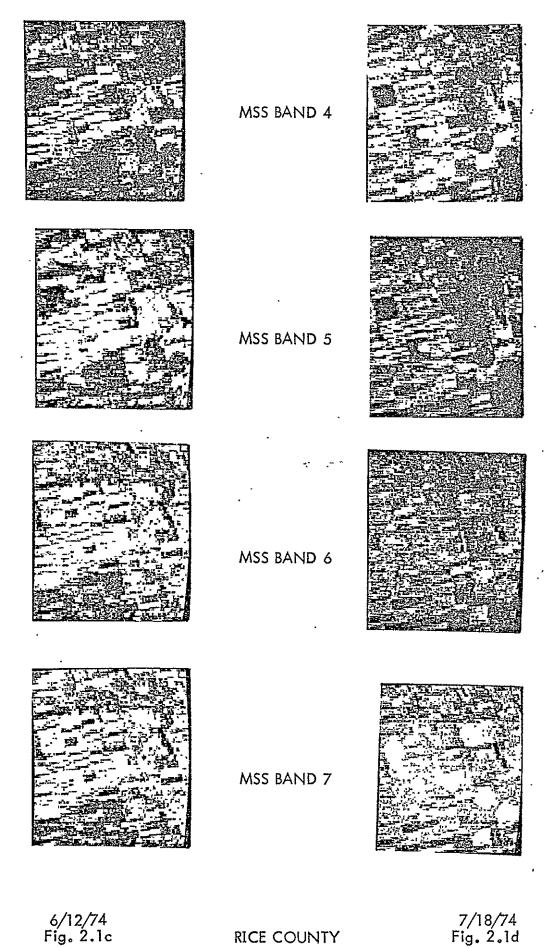


MSS BAND 7



10/21/73 Fig. 2.1a

4/18/74 Fig. 2.1b



are in Appendix BB1. Six variables were entered, the F - matrix and the classification functions are also given in Appendix BB1. The Jackknifed classification gives a total of 46.2% correct classification, with 75.6% of the corn being correctly classified, 37.7% of the wheat being correctly classified, 37.5% of the grass, 28.8% of the summer fallow, 14.3% of the non-agricultural and 43.2% of the grain sorghum being correctly classified. This poor rate of success cried out for an explanation. Three possibilities suggested themselves:

- the different soil types were contributing to the variation in the ERTS reflectivities which increased within crop type variation in reflectivity;
- 2. the atmospheric effects were contributing random variation to each ERTS band; or
- those observations mis-classified were edges, or places where ground truth was incorrect or had changed during the time period understudy.

To test the idea that the soil types were contributing to within group variation of crop types, each ERTS band was regressed onto soil type, using the REGRESS program of the KUCC time sharing system. The equations of all significant regressions were used to calculate the residuals for the various bands and these residuals were used in a rum of BMDP7M. Appendix BB2 contains the selected results of this run. This lead to a 47.1% total correct classification, a nonsignificant increase in the total percentage of correct classification. There was actually a 6% decrease in the number of grass observations correctly classified! There was a 10% increase in the number of summer fallow correctly classified and non-significant changes for the other categories. Next, straight ratioing of the data was tried (Appendix BB3). This time the program went 7 steps, i.e., included 7 variables, but the total correct classification was 46.4%. The percentage of correct classifications of winter wheat, grass, and corn increased and that of summer fallow and grain sorghum decreased. Thus it seems that if atmospheric interference is causing an increase in variation within crop types it is not corrected by straight ratioing. Figure 2.2 shows the change in percentage of correct classifications for the three different treatments of the data discussed above, as the variables are entered.

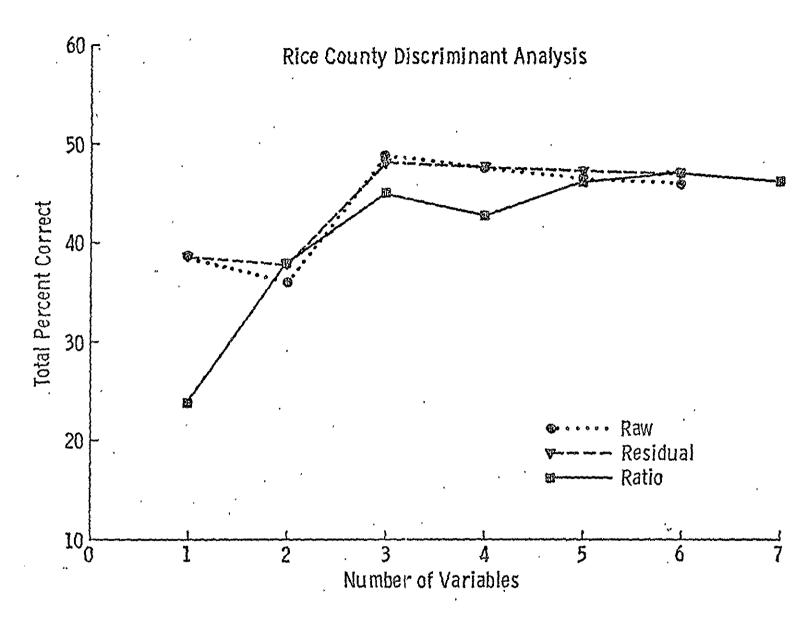


Figure 2.2

As a result of the above analysis, it was clear that there was not a reliable method for removing excessive error variance that did not take into account the confusing effects of soil-crop-date interaction. In order to find out the nature of the problem, BMDP9D, a general data description program, was used to look at the effects of classifying the observations on crop type alone, soil type alone, and cross classifying by soil and crop type. When only one criteria was used to classify the observations, most of the distributions were multi-modal. However, when both criteria were used to cross classify, the distributions were unimodal, according to the crude histograms produced by BMDP9D. To illustrate this look at Figure 2.3. This shows the mean and one standard deviation limits for ERTS reflectivity for each soil type within a date for band 4 for winter wheat in Rice county. As can be seen there is considerable variation within a date in the means for different soil types. Not only this, but the relation between the means for different soil types within a date is not the same from one date to the next. Now if you look at Figure 2.4, you see that the effect of soil is not the same within a date for different crop types. Thus there is a time-soil interaction (Figure 2.3) and a crop-soil interaction (Figure 2.4). It is not possible to look for the three way crop-soil-time. interaction with a graph, but we must use a statistical test. Figure 2.5a to Figure 2.5v show further the variation in crop signatures for the six crop classes to Rice county.

Forgetting the problems addressed above, there are two other methods of improving the total percentage of correct classification. These are:

- do not use categories that are rare to calculate the discriminant function;
- use prior probabilities, which describe the relative frequencies "known" to be present, to weight the decision rule.

Appendix BB4 shows the result of not using the category "non-agricultural" to calculate the discriminant functions. In this case, the percentage correct was 49.9, about a 4% improvement. If one used prior probabilities (Appendix BB5) then the total percentage correct was 61.2, a 15% improvement. When

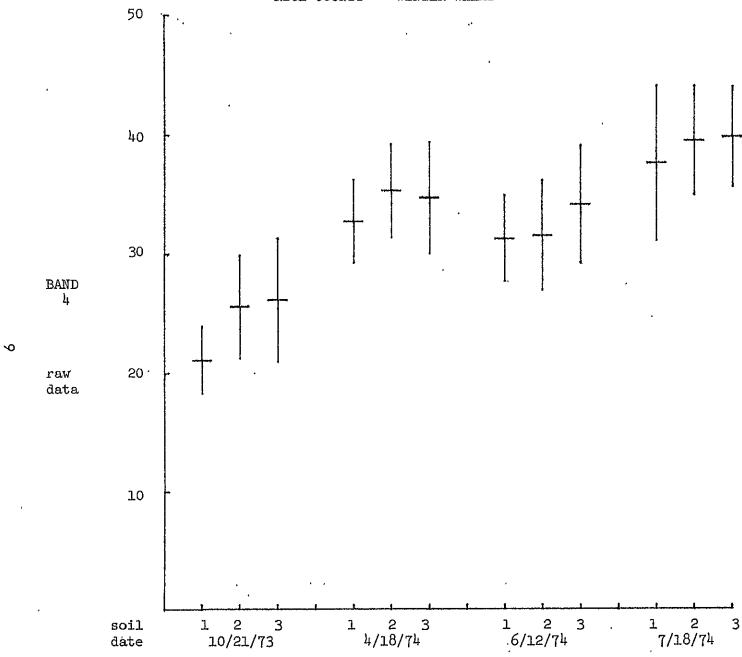


Figure 2.3

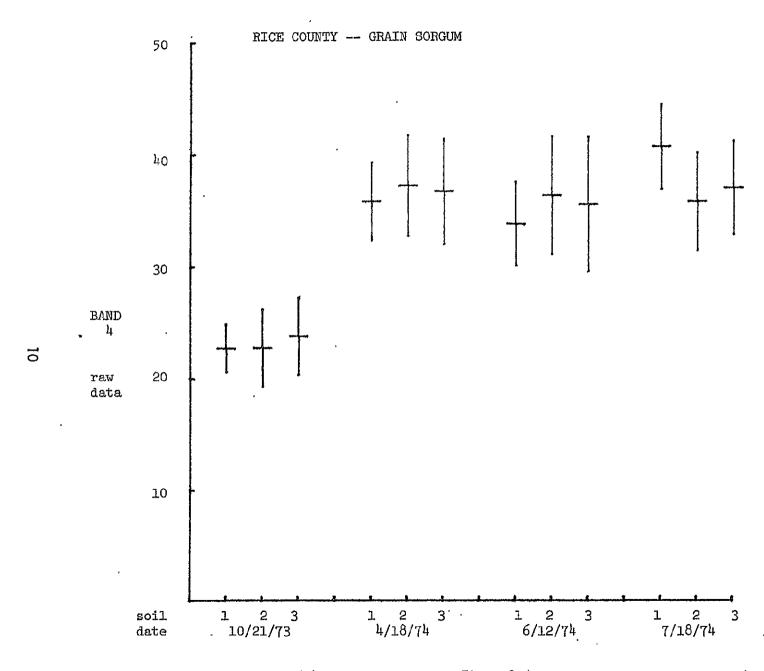


Figure 2.4

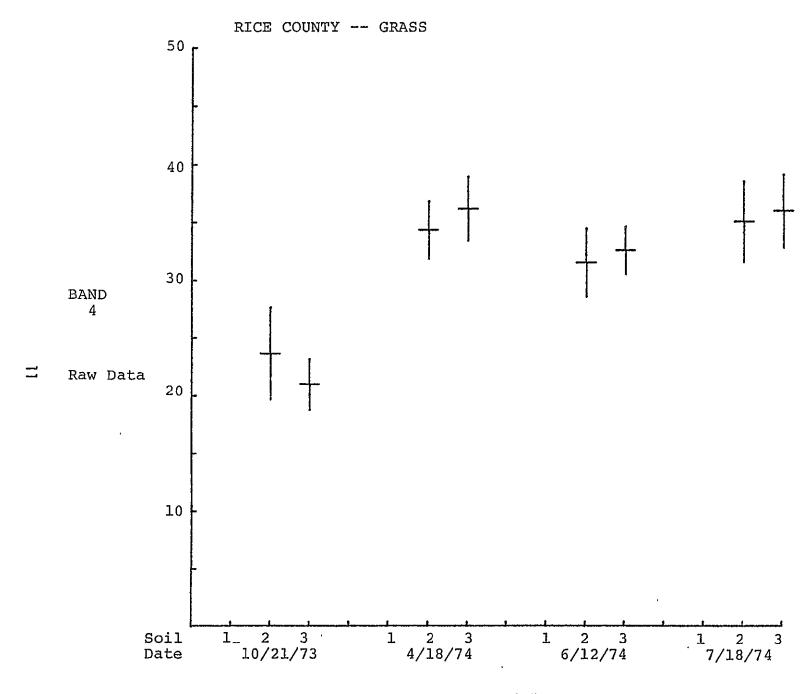


Figure 2.5 a

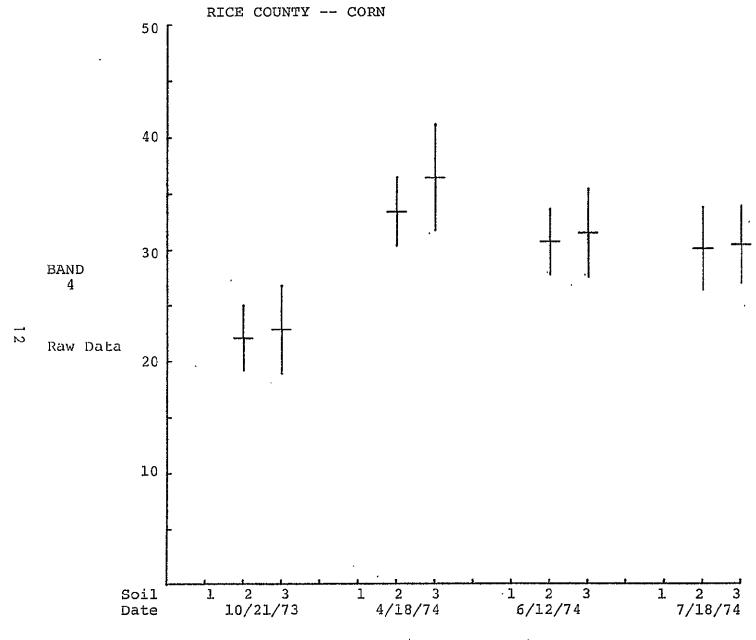


Figure 2.5 b

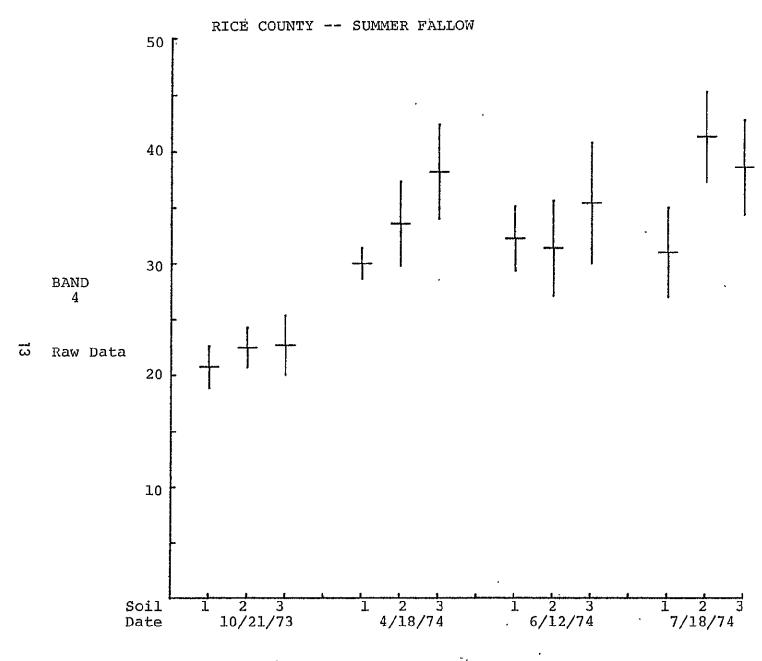


Figure 2.5 c

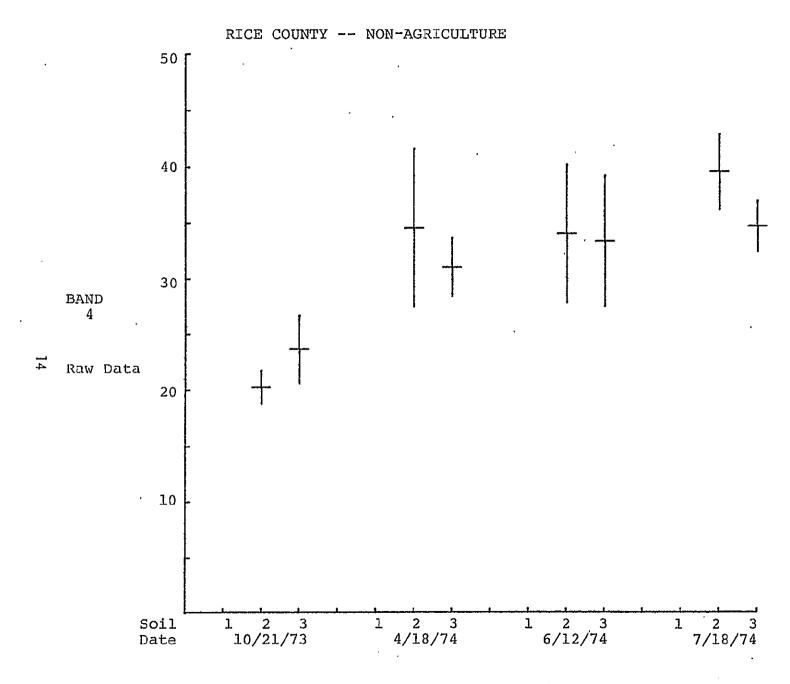


Figure 2.5 d

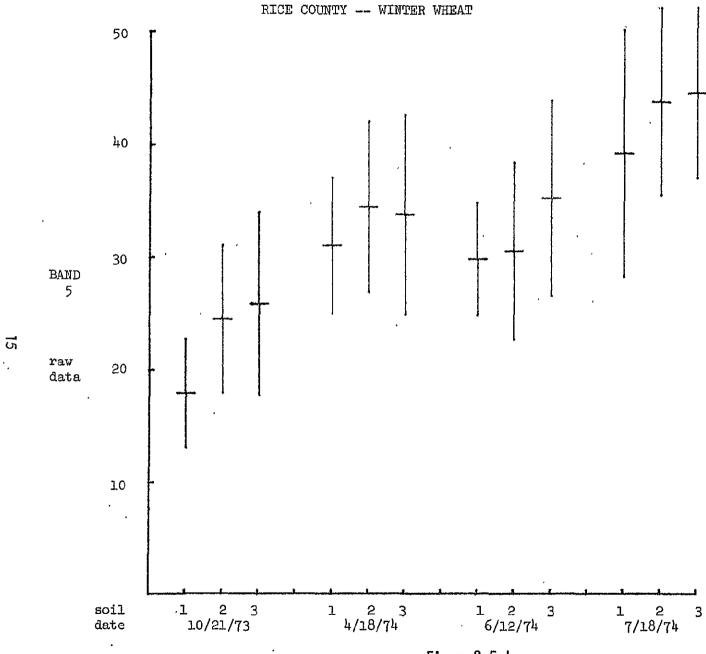


Figure 2.5 d

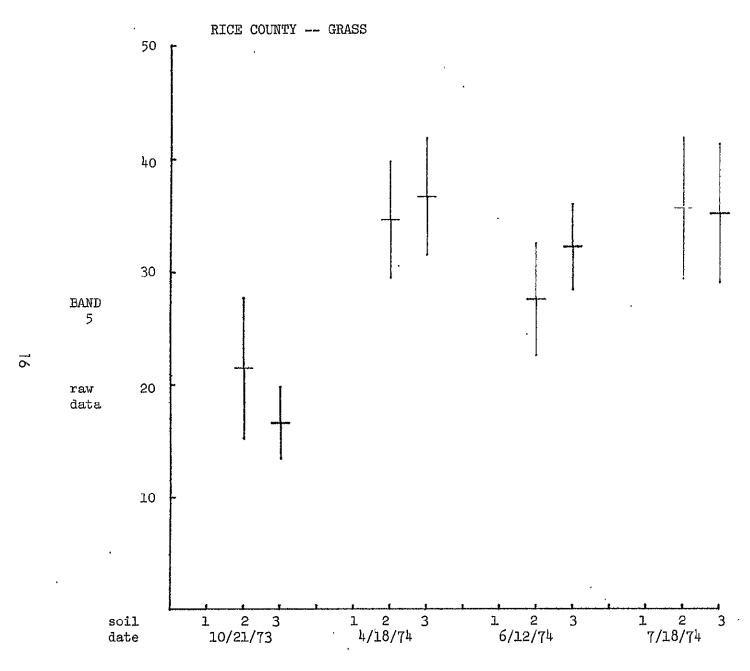


Figure 2.5 f

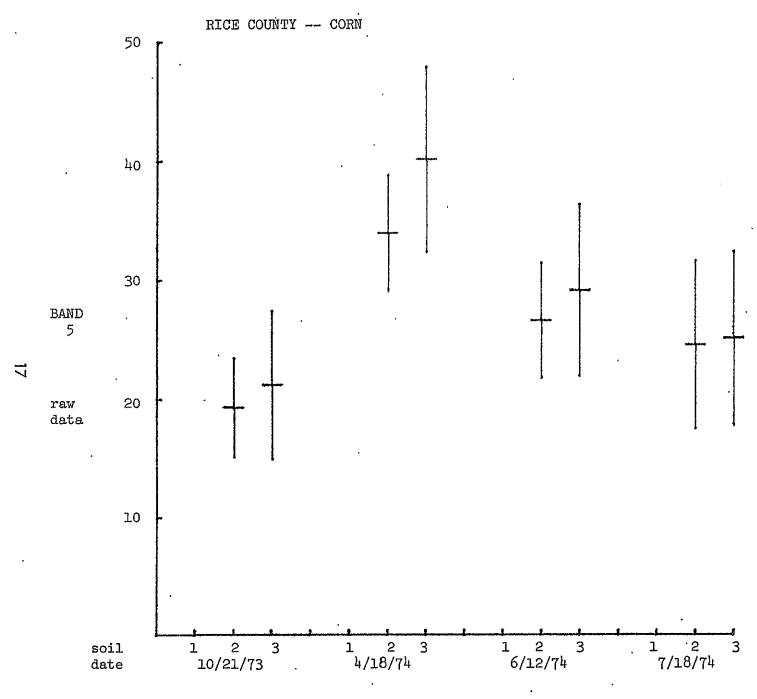


Figure 2.5 g

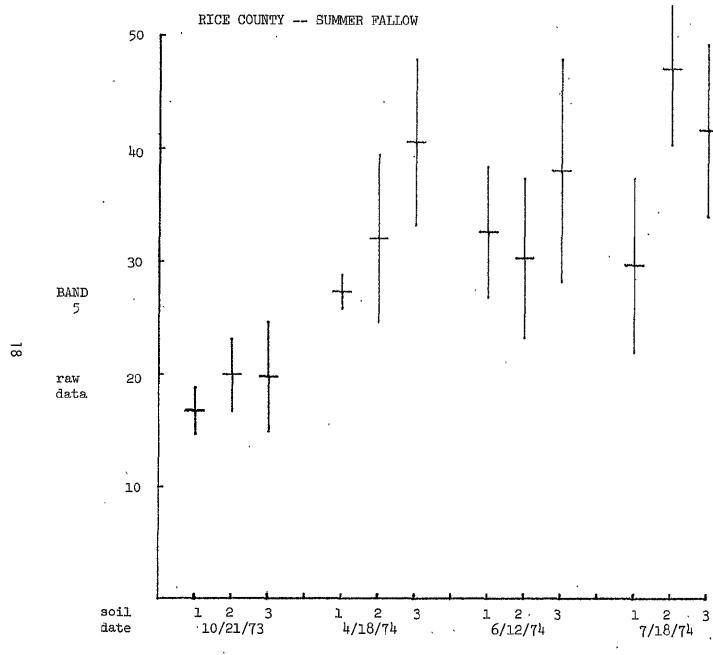


Figure 2.5 h

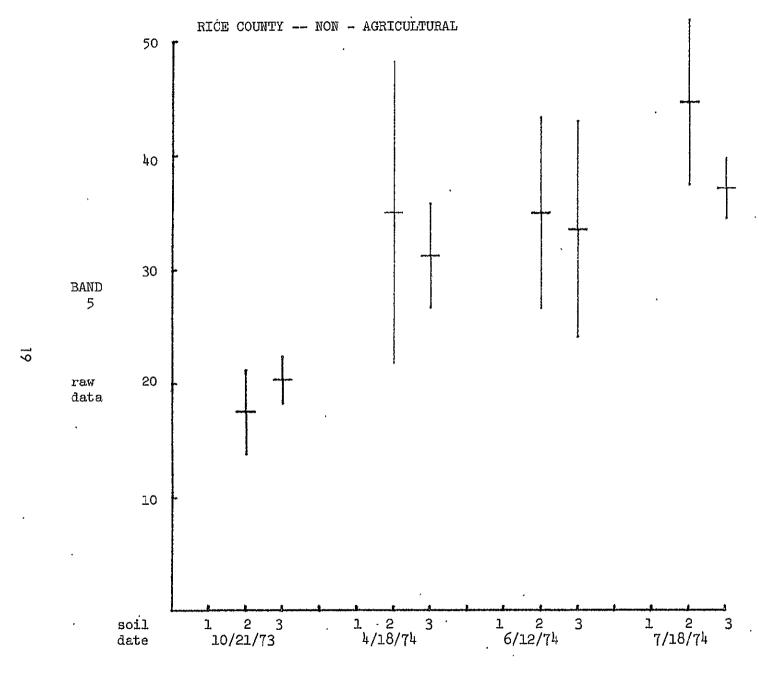


Figure 2.5 i

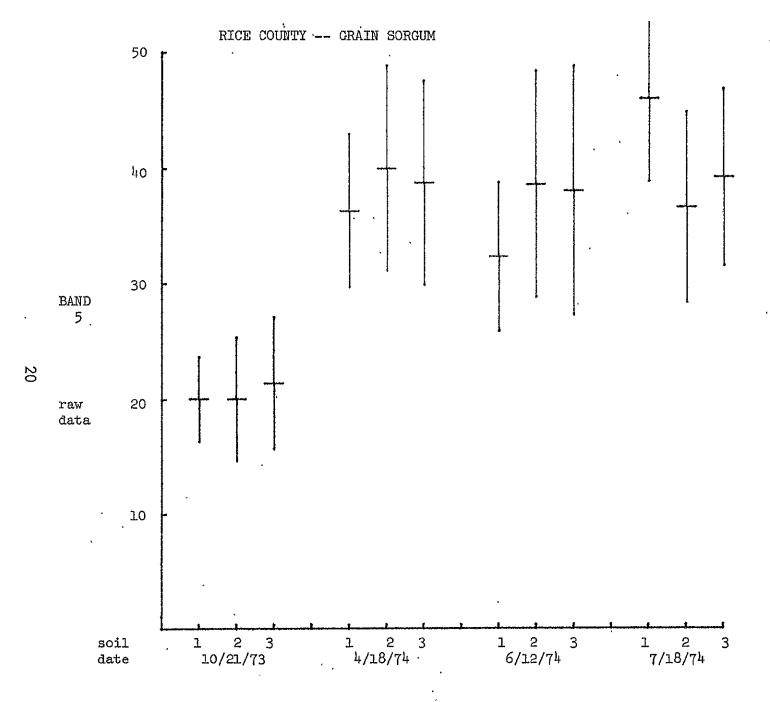


Figure 2.5 j

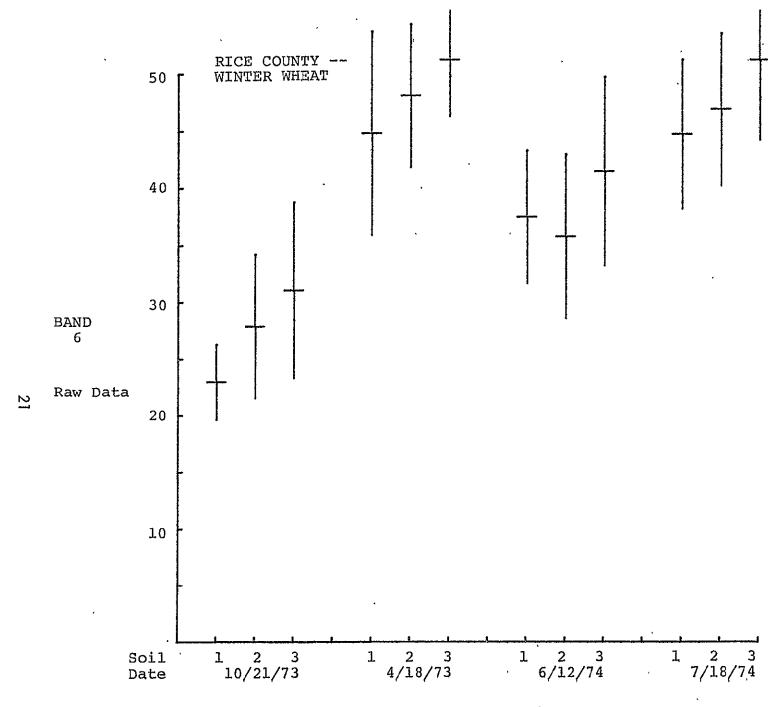


Figure 2.5 k

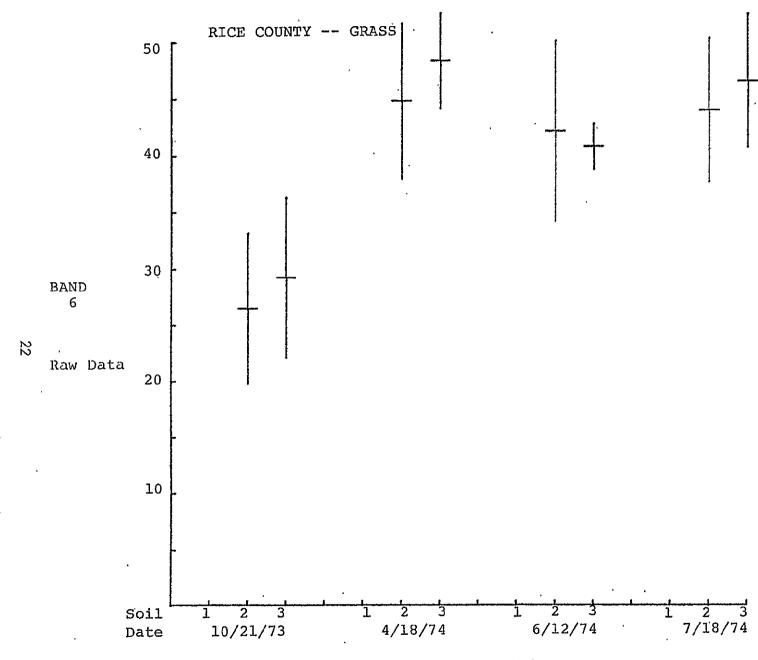


Figure 2.5 I

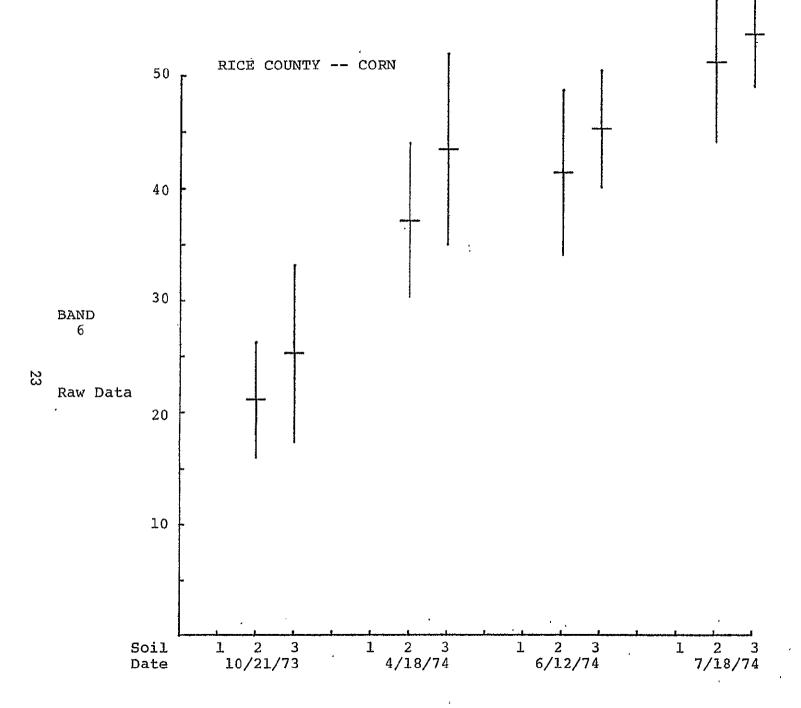


Figure 2.5 m

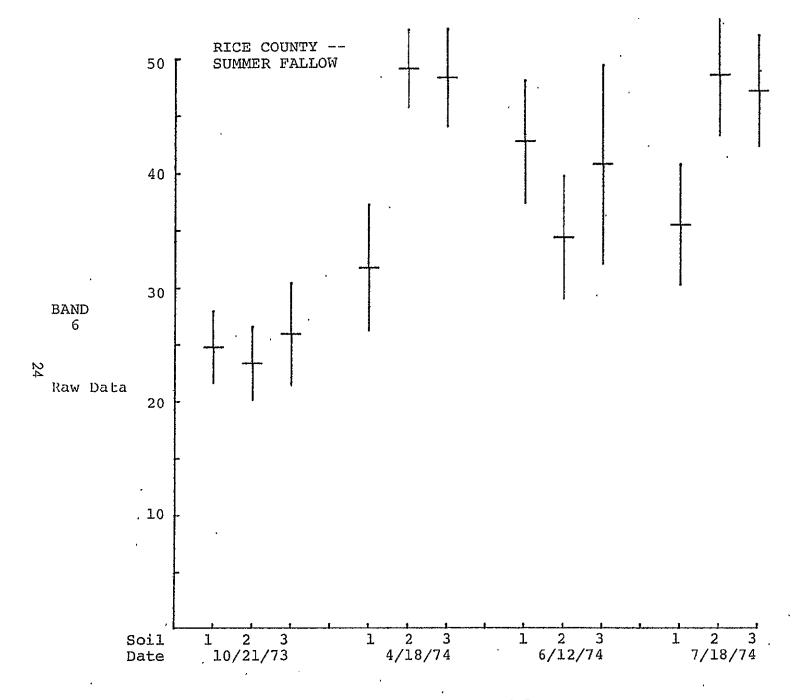


Figure 2.5 n

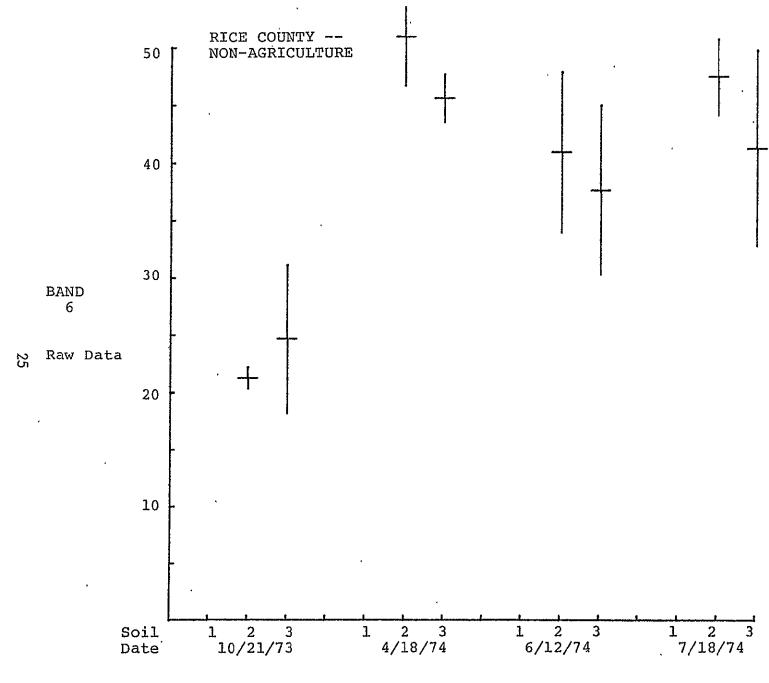


Figure 2.5 o

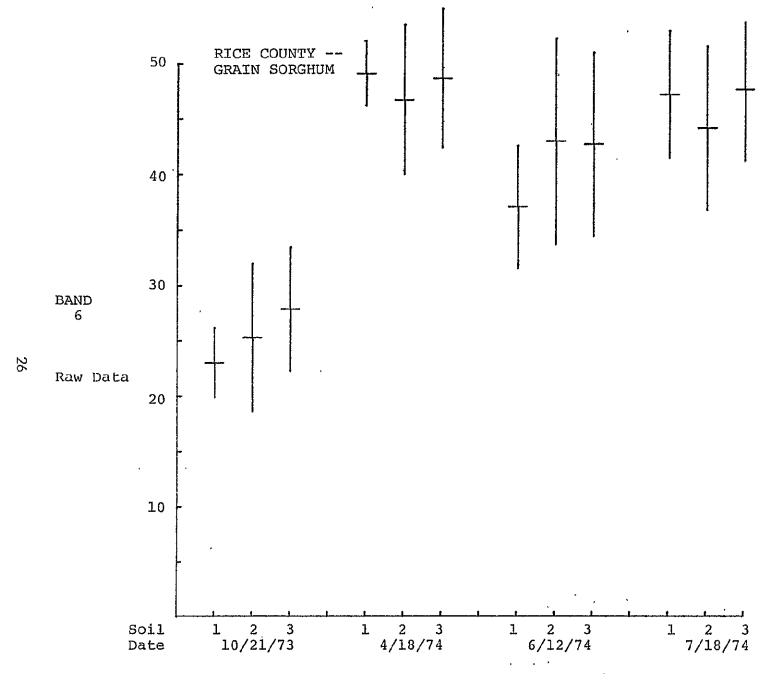
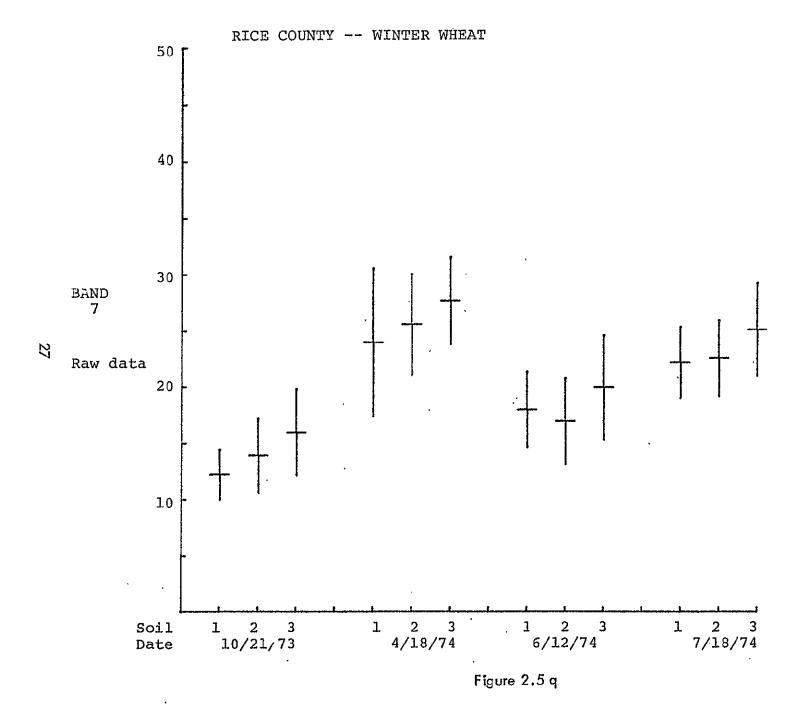


Figure 2.5 p



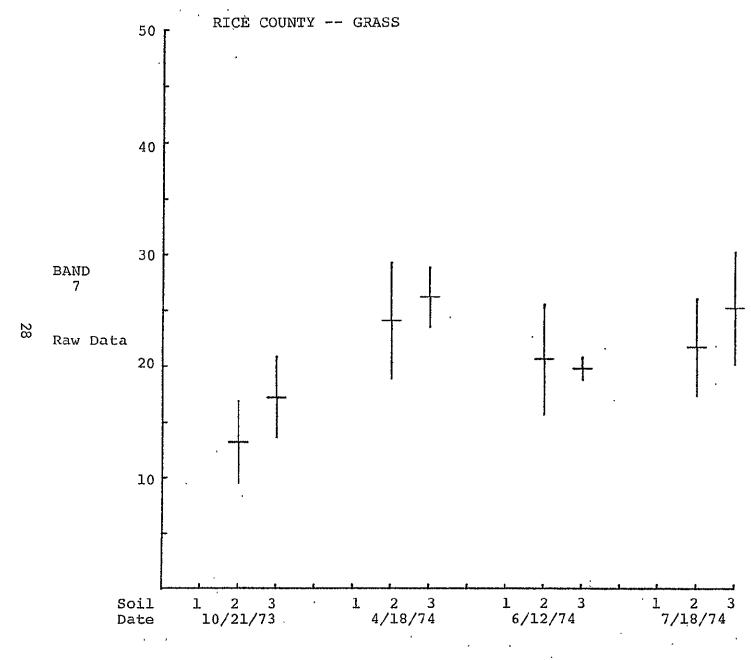
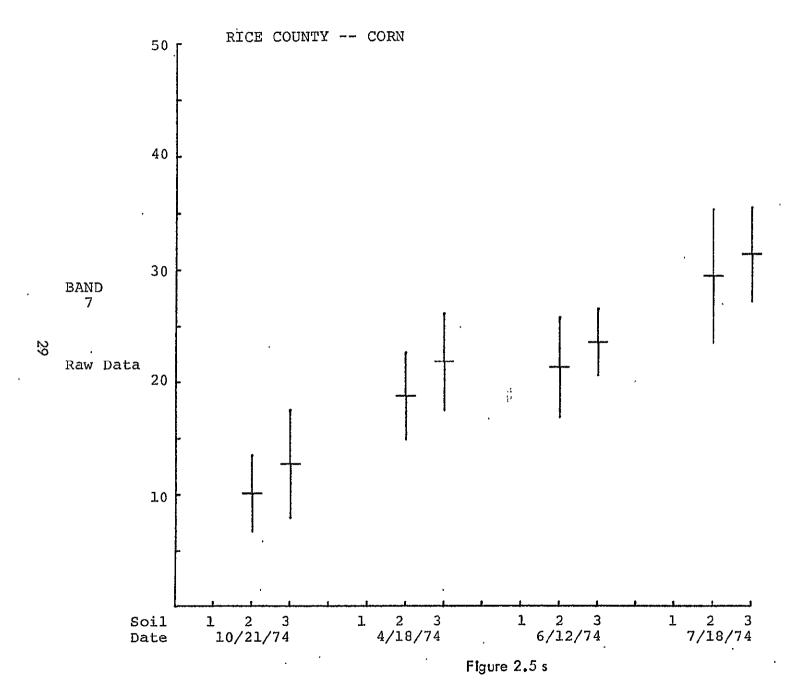


Figure 2.5 r



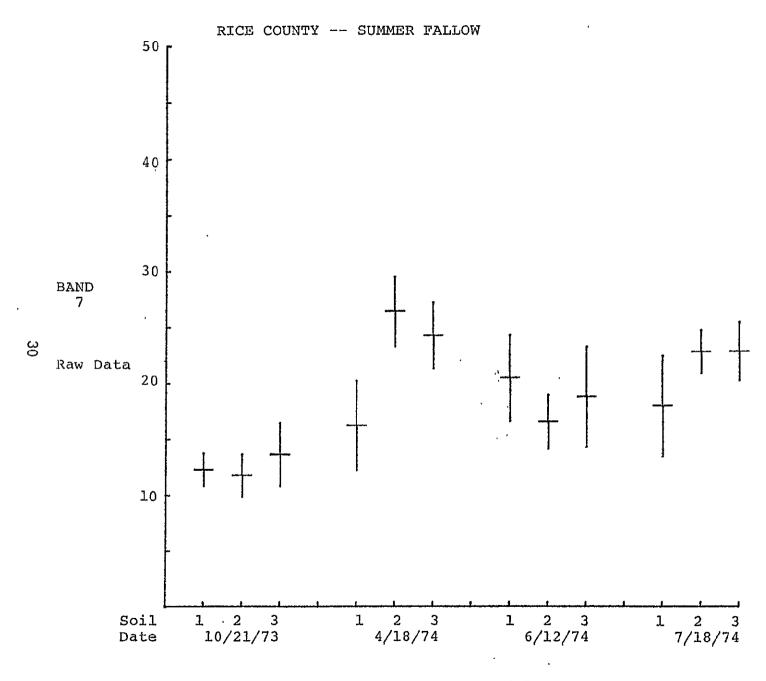


Figure 2.5 t

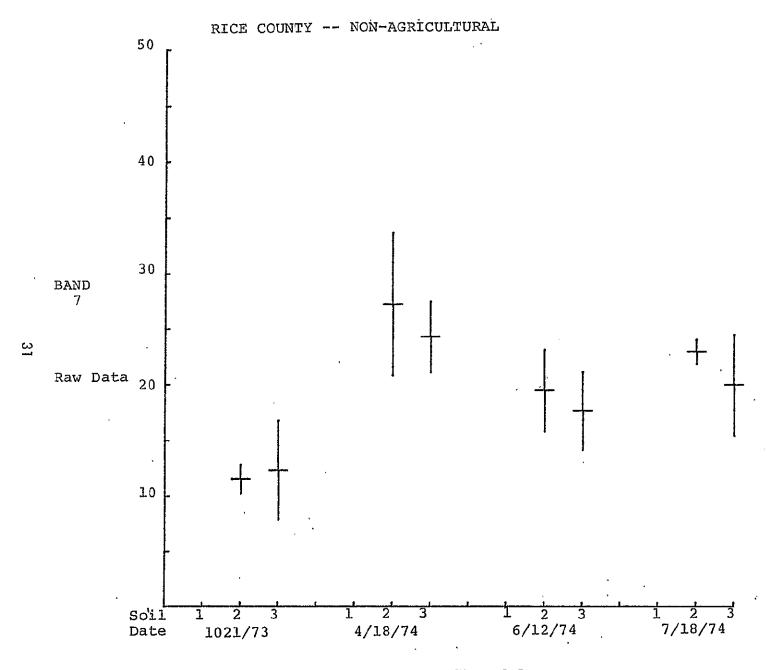


Figure 2.5 u

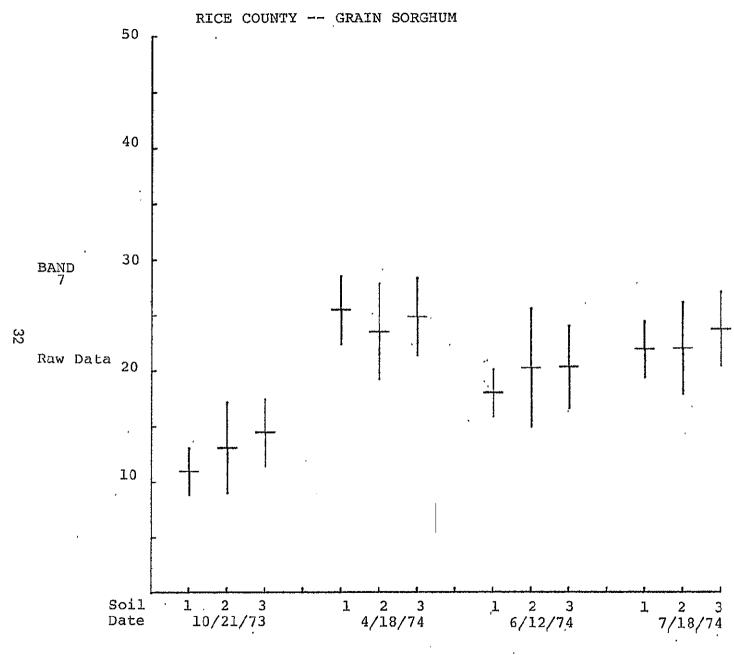


Figure 2.5 v

both prior probabilities and the deletion of the non-agricultural category were combined, the total correct percentage classification was 61.9. Thus, the best improvement was obtained by using prior probabilities of class frequency.

Another way of dealing with the problems created when there are more than one criteria for classifying ones groups (in this case soil and crop type) is to combine the two criteria into one and use linear contrasts to pick out the groups one wants to contrast. The results of one set of contrasts is shown in Appendix BB7. Here there was a 35.5% total correct classification. This is not too bad since there are three times as many groups (potentially, that is, actually there are some categories missing such as grass on soil type 1) and thus, more types of error are possible. Since we are interested in crop type only, and the contrast we used only looked at crop type differences we can ignore the type of error where winter wheat on soil type I got classified as winter wheat on soil type 2. Ignoring this type of error, the total correct classification was increased to 51.0%. Since non-agricultural was excluded from calculating this equation, there was only a 1% increase in correct classification. Remember that leaving non-agricultural out increased correct classification from 46.2% to 49.9%. It may be that using a different contrast would improve the percentage of correct classification even more.

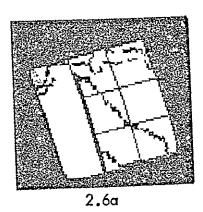
A canonical correlation analysis was carried out to see what percentage of the variation in the two ground truth parameters would be explained by variation in the ERTS bands. With the rank of the ERTS band matrix reduced to 5, from 16, 27.33% of the variation in the ground truth bands was determined by variation in the ERTS bands.

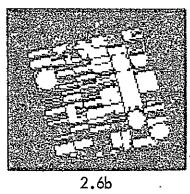
At this point we will return to consider the third source of error mentioned above, i.e., edge effects and ground truth errors. Since BMDP7M gives a listing of all individuals and the group to which they were assigned and the group to which they actually belong it was possible to find the coordinates of those observations which were not classified correctly. Using a routine that can put a marker on the IDECS screen, the bad classifications were located on a symbolic map of the crop types. It was found that most of the bad classifications for observations that were winter wheat, corn, grass or summer fallow were on edges. This was not the case with grain sorghum. Observations that were in the middle

of grain sorghum fields were misclassified. It should be noted that there were a series of bad floods in the crop year '73-'74 and parts of some fields were damaged, some crops were replanted. In one field that was damaged some of the classification errors were from observations in the damaged area.

Based on the above analysis, there are a number of procedures that might help improve the rate of correct classification. First, a more accurate method of overlaying ground truth and ERTS bands should decrease the error due to edge effects, also, using the shrink and fill options on KANDIDATS should help this problem. Secondly, it would help to have a large enough area to sample so that rare categories would have a large sample size. Alternately, rare categories could be eliminated from the function as was done above. Also, in this particular case it seemed that there were basically only three distinguishable categories (winter wheat, corn, grain sorghum), perhaps the use of more images from throughout the growing period would help, or the use of some different spectral bands. In statistical techniques, it may be necessary to use a logistic or quadratic discriminant function. These are much more complicated to compute. It may be that some transformation of the ERTS bands will give better classification, but this would be largely trial and error.

In the analysis of Morton county, the original BMDP7M analysis gave 74.1% total correct classification and 16 variables were included in the discriminant function. Soil type was a variable included in the discriminant function, actually the fifth variable entered. This is in contrast to the Rice county study which did not use soil type as a discriminating variable. In studying the results of the Morton county analysis (Appendix CCI) it is clear that there is a much better discrimination than for Rice county. On the other hand, both Morton and Rice counties are much better classified than Saline county (Appendices DD1 and DD2). In Saline county, soil type was the first variable to be used to discriminate crop types, and only one ERTS band was used. This produced only 43.4% correct classification. The increase in percent correct classification from Saline to Rice to Morton counties is correlated with the number of ERTS scenes available for that county. This supports the hypothesis that more scenes of a site would permit a better success rate. If soil type is not used for





Figures 2.6a and 2.6b show the ground truth for soil and crop types for Rice County.

discriminating in the Saline county site (Appendix DD2), the percentage of correct classification drops to 22.8%. If one were to use the Rice study as a guide, the addition of a June observation to the Saline county site would have improved the classification.

The Morton and Saline county sites need to be studied in more detail before much more can be said about them. Following are a list of things that have been done but which have not been included in this report, or discussed in it. BMDP9D analysis has been done on both Morton and Saline counties. Black and white and color slides have been made of all of the Rice county bands, ERTS and ground truth.

2.4 Effects of Soils on Crop Classification

The soil ground truth used in the analysis to date has consisted of rankings of agricultural suitability, taken from Figures 2.7a - 2.7c. Unfortunately, a number of different textures of soil (and presumably of different reflectance) may be included under the same ranking for agricultural suitability. For example, in Figures 2.7a and 2.6a you can see that the area marked 198x1 is classified the same as area 208x2, while in actuality they have different sources, denoted by the codes 198 and 208 and different textures denoted by the horizontal versus diagonal hatching. Figures 2.7b-2.7e show the soil, ground truth for the Morton, Saline, Finney and Ellis sites respectively. In the analysis of Rice county as you recall an interaction between the soil type and crop type was discovered which prevented using the simple regression of band against soil to remove the effect of soil on reflectance. The use of a more relevant soil classification will probably not change this, although, it may make it more susceptible to analysis.

It is reasonable to expect each plant type to react differently to given soil types. This is because not only are the plants physiologically different, but differences in the character of the soil, such as the ability to hold water, the ability to drain excess water, etc., will effect such general properties as the rate and stage of growth at a particular date after planting, and the length of time necessary for the crop to mature. Thus, to accurately include the effect of soil type one would need sufficient variables to indicate the

reflectance of bare soil, and the plant soil interaction. However, it is more complicated than this, because weather interacts with soil type to effect not only the reflectance of the bare soil at a given time, but also to create a weather, soil, crop interaction. It is easy to imagine the complicated types of interaction between soil type, topography, and crop type for various extreme weather types.

2.4 Crop-Soil-Weather Interactions

Above, we have suggested some of the ways our analysis may be complicated by interaction. It would probably be futile to try and use the variation in weather from site to site, within a year to discover the effect of weather. This is because the general soil types vary from county to county (Table 2.1) and there is little concordance in source or texture of soils from site to site (Table 2.2 and Figures 2.7b-2.7e). Thus, within a year, the effect of weather would be confused by the soil-crop type interaction. The only way to resolve the problem is to have data from a number of years from a particular site. Then it would be possible to resolve the effects of crop type, weather, and soil type on reflectance for a particular site. If the ERTS images were collected at the same time for all of the sites thus removing the effects of look angle and sun elevation it might be possible to remove the effects of site by using Longitude and Latitude as covariates in the discriminant analysis. From a report by M. Jay Harnage, HC/75/102 at the Houston NASA Center it can be seen that solar angle can have a significant effect on the image contrast as a function of band wavelength. Thus, the fact that images of different sites were t aken not only on different dates, but also at different solar angles would have a confusing effect on trying to develop a site free discriminant method. This would also be a problem in going from year to year for a particular site.

Table 2.1

This table of general soil types was taken from a map of soils for the state of Kansas, compiled by O. W. Bidwell, Kansas Agricultural Experimental Station and C. W. McBee, Soil Conservation Service, Salina, KS., 1973. Published by the Kansas Agricultural Experiment Station, Kansas State University, Manhattan.

Site	Soil Types	Description
Saline Co.	Ustolls, Usterts, and Udolls	Deep, moderately deep, and shallow, dark grayish brown and very dark grayish brown silt loams, silty clay loams, and silty clays; depth to secondary carbonates, more than 36 inches.
Rice Co.	Ustalfs, Ustolls, and Aquolls	Deep dark grayish brown loams and fine sandy loams and pale- brown loamy fine sands; depth to secondary carbonates, more than 36 inches.
Ellis Co.	Ustalls and Usterts	Deep and moderately deep, dark grayish brown silt loams and moderately deep gray clays; depth to secondary carbonates, less than 36 inches.
Morton Co. & Finney Co.	& Ustolls, Orthents, and Ustalfs	Deep, grayish brown and dark grayish brown silt loams; depth to secondary carbonates and less than 36 inches.

Table 2.2

This table of soil sources was taken from the maps listed in Appendices B, C, and D.

Site Source

Saline Co. Stream terrace deposits

Rice Co. Stream terrace deposits, old alluvium and wind reworked

sands, old alluvium and wind laid sands

Ellis Co. Loess; Loess, Limy shales, old alluvium

Finney Co. Outwash loess, lacustrine deposits, terrace deposits

Morton Co. Loess, old alluvium, old alluvium sands

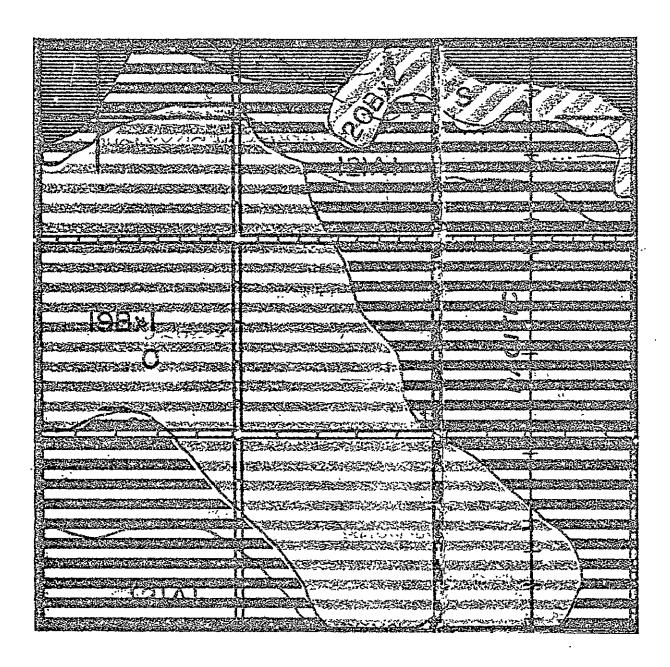


Figure 2.7a Soil Type Rice County

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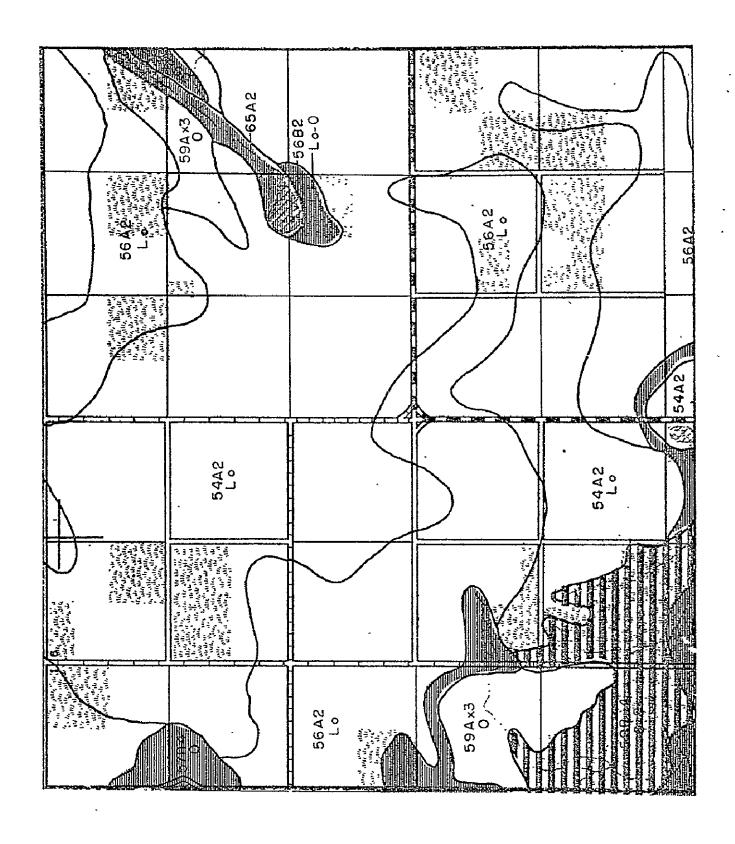


Figure 2.7b Soil Type Morton County

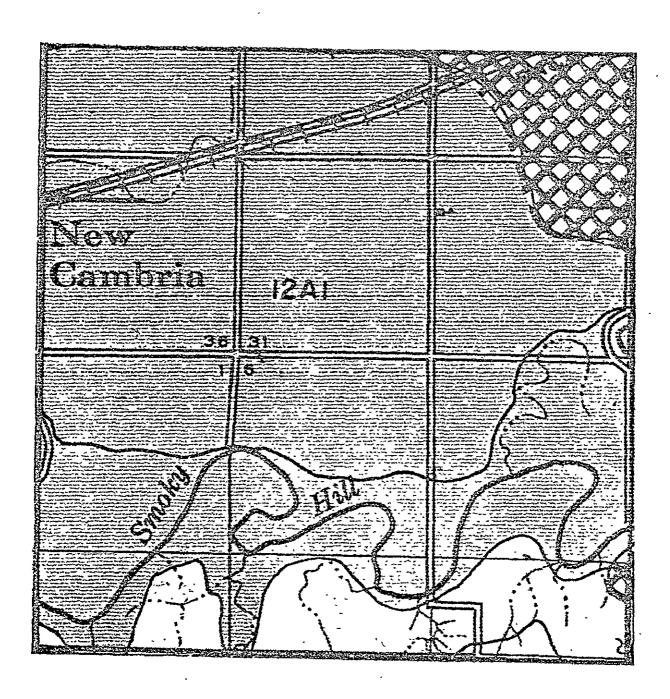


Figure 2.7c Soil Type Saline County

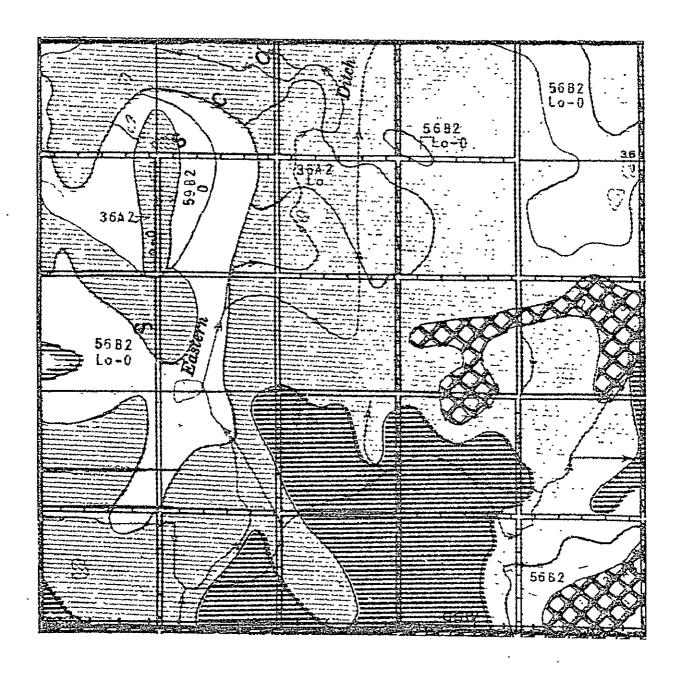


Figure 2.7d Soil Type Finney County

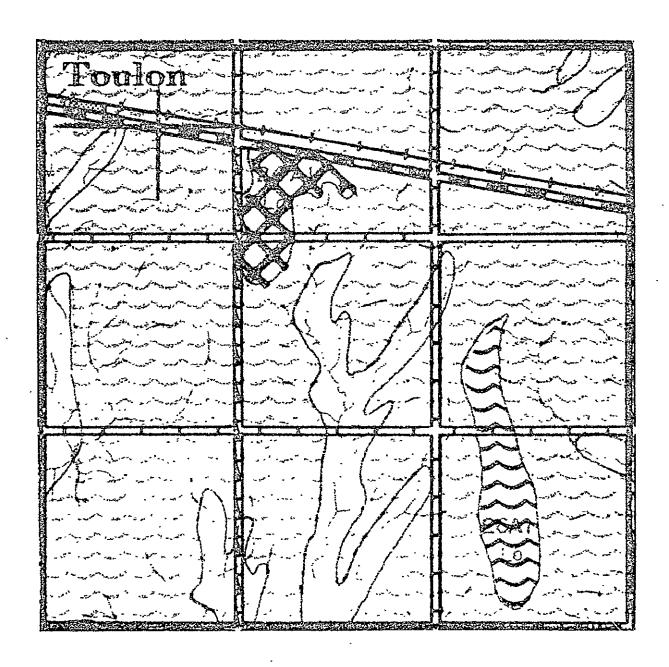


Figure 2.7e Soil Type Ellis County

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3.0 PATTERN DISCRIMINATION WITH A BAYES TABLE LOOK-UP RULE

Four test sites were processed using the table look-up rule. These were Rice, Saline, Morton and Finney counties. Sites were typically processed in the following manner:

- (1) Ground truth for crop type was separated after registration and edited. Editing consisted of removing categories of rare occurence and shrinking the description of each ground truth region. This has the effect of removing ground truth, and hence statistics gathering, from the edges of fields. Hopefully, the training statistics will be improved.
- (2) An error rate measure was run for all band pairs for each site. This gave a measure of which band pairs would produce the best results for discrimination. The best band pairs for each site are given in succeeding sections.
- (3) The three best band pairs were used in the table look-up processing. Several levels of error parameters were applied to each image. The results are reported in the following sections.
- (4) The best bands were rotated onto the principle axis by a principal component analysis. The resultant image was then used as input to steps (2) and (3) above.

In addition some spatial processing of the resultant category map was experimented with for Rice County. The spatial processing reduced the error rate.

The following sections outline the specific processing parameters for the four test sites.

3.1 Supervised Discrimination of Rice County Image

The image for Rice county was intensely studied. Several band pair sets were tried along with several different decision rules. The following band pairs were used with a majority vote decision rule:

MSS Band 5/Jul. 74 - MSS Band 7/Jul.74
MSS Band 4/Oct. 73 - MSS Band 6/Oct. 73
MSS Band 4/Apr. 74 - MSS Band 6/Apr. 74

Equal prior probabilities were assumed for each category and a majority vote table look-up rule was used.

Mis/False	Parameter:	5	% Mis-identification	% False identification
β	α	# categories	error	error
0.0	0.1	8	48	68
0.0	0.1	6	48	43
.021	.3	6	44	46
.014	.2	6	47	43

A second step involved using the intersection table look-up rule with different band pairs.

Input Para	meters		Band Pairs	%Mis-identification	%False Identification
B	α	categories =	•	error	епог
.021	.3	8	MSS band 4/Oct. 73-MSS band 4/Apr. 74, MSS band 6/Oct. 73-MSS band 6/Apr. 74	51	7 6
.021	.3	8	MSS band 5/Oct. 73-MSS band 5/Apr. 74, MSS band 7/Oct. 73-MSS band 7/Apr. 74	49	74
.021	.3	. 8	MSS band 4/Apr. 73-MSS bend 4/Jun. 74, MSS band 7/Apr. 73-MSS bend 6/Jun. 74,	50	72
.021	.3	8	MSS band 5/Apr. 74-MSS band 5/Jun. 74, MSS band 7/Apr. 74-MSS band 7/Jun. 74	49 .	72
.021	.3	8 .	MSS band 4/Jun. 74-MSS band 4/Jul. 74, MSS band 6/Jun. 74-MSS band 6/Jul. 74	46	69
.021	.3	. 8	MSS band 5/Jun. 74-MSS band 5/Jul. 74, MSS band 7/Jun. 74-MSS band 7/Jul. 74	45	68
.028	.4	4	MSS band 5/Apr. 74-MSS band 5/Jun. 74, MSS band 6/Jun. 74-MSS band 5/Jul. 74, MSS band 7/Jun. 74-MSS band 7/Jul. 74	41	17
_021	.3	4	MSS band 5/Apr. 74-MSS band 5/Jun. 74, MSS band 6/Jun. 74-MSS band 5/Jul. 74, MSS band 7/Jun. 74-MSS band 7/Jul. 74	43	18

In the last two experiments the categories wheat, grain sorghum, corn and summer fallow were retained. Most of the error occured due to mis-identification of summer fallow and grain sorghum. The principal components of the Rice image were found and the image date projected onto the principal axis. The error rate measure showed axis pairs 1-2, 1-3, and 2-3 would produce the least error. The minimum error from these trials was 26%.

Spatial post-processing was tried with the Rice image. This was a reassignment of the categories based on geometric considerations. The first spatial poperation on a category map was to change to reserve decision category assignments

of resolution cells whose neighbors differed. If a resolution cell has more than n neighboring resolution cells whose assignment is different, then its category assignment becomes reserved. This has the effect of eliminating small regions from the classified image. The shrunken map is then iteratively filled back assigning resolution cells of reserved decision to the categories of its nearest assigned neighbor. The shrink-fill operation typically increases classification accuracy. Note the decrease in error percentage with a shrink with a maximum of I dissimilar neighbor and a fill.

Bayes Type	Band Pairs	Bayes error mis/false	filled	Number of Dissimilar Neighbors for Shrink Followed by 1 Fili 4 3 2 1				
intersection table look-up rule	MSS band 5/Jul. 74-MSS band 7/Jul. 74 MSS band 4/Oct. 73-MSS band 4/Apr. 74 MSS band 4/Jun. 74-MSS band 4/Jul. 74	31/24	34/27	34/27	34/24	36/25	35/15	43/19
majority vote table look-up rule	MSS band 5/Jul. 74-MSS band 7/Jul. 74 MSS band 4/Oct. 73-MSS band 4/Apr. 74 MSS band 4/Jun. 74-MSS band 4/Jul. 74	35/28	36/29	36/29	35/22	35/18	35/17	39/16

Examples of contingency tables are given in Tables 3.1.1 and 3.1.2 for an image with no spatial processing and spatial processing with shrink and fill, respectively.

3.2 Supervised Discrimination of Saline County Image

The Saline county image was processed using fewer different parameters. There is some problem with the NASA date-to-date registration of this image set. This problem can be corrected at a later time. The error rate step selected the following band pairs as best for the discrimination step:

MSS band 4/Oct. 73-MSS band 6/Oct. 73
MSS band 4/Oct. 73-MSS band 4/Apr. 74
MSS band 4/Jul. 74-MSS band 6/Jul. 74

The errors are listed below.

 $\beta = .028 \alpha = .4$

COL = ASSIGN CAT ROW = TRUE CAT

R DEC WHEAT GSORG CORN SUFAL TOTAL BERR X ERR X SD

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UNKIN	3056	2188	795	348	110	6497	0	0	0
MEAT	2t1	441	32	19	12	715	63	13	1
GSORG	192	106	211	7	3	519	116	35	1
CORN	136	2	11	259	0	408	13	5	0
SUFAL	60	41	20	0	22	143	61	73	4
	•								

TOTAL 3655 2778 1069 633 147 8282 253 #ERR 149 63 26 -15 253 ***** ***** ***** % ERR 25 23 9 41 24 ***** ***** *****

Table 3.1.1 Contingency table for image with no spatial processing

CONTINGENCY TABLE FOR RICEBOCHB -19 RICEBG113 - 1 SCALE FACTOR 10** 0

 $\beta = .028 \quad \alpha = .4$

COL = ASSIGN CAT ROW = TRUE CAT

R DEC WHEAT GOORG CORN SUFAL TOTAL BERR X ERR X SD

UNKHN	0	4581	1092	776	48	6497	0	0	0
HEAT	0	681	21	13	0	715	34	5	0
GSORG	0	188	298	33	0	519	221	43	2
CORN	0	39	8	360	1	408	48	12	i
SUFAL	0	82	31	1	29	143	114	80	3

Table 3.1.2 Contingency table for image with spatial processing

Bayes Parameter		% Mis-identification	% False identification
β	α	error	error
.028	.4	74	67
.0315	.45	73	70
.035	.5	71	· 72

The following categories were retained for processing: wheat, grass, corn, soybeans, non-agriculture and grain sorghum. Further work must be done to register the image correctly and try to improve the results.

3.3 Supervised Discrimination of Morton County Image

The Morton county image was processed along the steps outlined above. The error rate measure selected the following bands for further processing.

MSS band 5/May 9, 74-MSS band 7/May 9, 74
MSS band 5/May 27, 74-MSS band 7/May 27, 74
MSS band 5/Jul. 74-MSS band 7/Jul. 74

The Bayes decision rule used the following parameters with corresponding results.

Bayes Po	arameter	% Mis-identification	% False identification
β	α	error	error
.0245	.35	25	16 ·
.028	.40	27	18
.0315	.45	28	20
.035	.50	29	22
.0385	.55	28	23
.042	.7	29	26

The categories wheat, grass, corn, summer fallow, grain sorghum and rye were retained for processing. Most of the error occured in discriminating grain sorghum and rye.

The contingency table for the first entry is shown below.

CONT	INGEN	Y TAEL					-	Y0 - 1	SCAL	E FACT	OR 10**	0
$\beta = .0245 \alpha = .35$												
		COL.	= AS	SIGN C	AT	ROW =	TRUE	CA1	•			•
-	r dec	HEAT	GRASS	CORN	SUFAL	GSORG	RYE	TOTAL	. #ERR	X ERF	R X SD	
UKW	8593	2085 .	505	141	1392	72	17	12805	0	0	0	
WEAT	1931	1952	1	. 0	89	. 0	2	3985	92	4	0	
Grass	529	7	490	0	2	0	0	1028	9	2	0	
CUFA	541	4	0	175	6	14	0	740	24	12	0	
SUFAL	1583	9.	3	5	1521	2	4	3127	23	1	0	
650RG	194	i	0	2	10	13	0	220	13	50	1	
RIE	161	27	0	0	47	0	16	251	74	82	2	
TOTAL	13532	4095	999	323	3067	101	39	22156	235	25	0	
ER	0	48	4	7	154	16	6	235	****	****	****	
I ERR	0	2	1	4	. 9	55	27	16	*****	****	****	

The nine best bands selected by the error rate program were used for principal components. In addition to those listed above MSS band 4/Jul. 74, MSS band 6/Jul. 74 and MSS band 5/Oct. 73 were used. The first three principal component axes were used for Bayes discrimination. The results are below.

Bayes Parameters		% Mis-identification	%False identification			
β	α	error	error			
.028	.4	40 .	35			
.0315	.45	40	38			
.035	.5	40	38			

The principal component results do not show any improvement over using the raw data image. Further work will be in the areas of using the shrink-fill operation to improve accuracy and finding the error measure for the principal component image.

3.4 Supervised Discrimination of Finney County Image

The last site processed was that occuring in Finney county. Again the steps outlined above were followed for this site. The error rate measure selected the following band pairs.

MSS band 5/Oct. 73-MSS band 7/Oct. 73
MSS band 5/Apr. 74-MSS band 7/Apr. 74
MSS band 5/Jul. 74-MSS band 7/Jul. 74

Five categories were retained for the Finney image: wheat, grass, corn, summer fallow and grain sorghu. The image was processed with the Bayes discrimination rule with the following results:

Bayes Parameters		% Mis-identification	% False identification				
β	α	error	error				
.0245	.35	25	18				
.028	.4	. 26 ·	18				
.0315	.45	24	. 18				
.035	.5	_. 24	18 、				
.0385	.55	21	20				

Following is the contingency table for the first entry above.

— <u>₩</u>	FINGEN	CY TABI	E-FOR	FIM	ACCNT	-23—F	INNAGE	¥1!	I—SCAL	E-FACT	OR 10##	_0
			β=	.02	45	α = ,	.35	٠.,			•	
		COL	= AS	SIGN C	AT	RO# =	TRUE	CAT	<u> </u>			
	R DEC	WHEAT	GRASS	CORN	SUFAL	CSORC	TOTAL	#ERR	% er	R % SD		$\frac{1}{1}$
UN HI	19483	2063	621	2501	158	606	25432	0	0	. 0		+
MEAT GASS	975 605	706 5	9 123	10 16	3	6	1709 756	28 28	4 19	0		
CCFN SLFAL	1230 505	25 5	9 12	1017 21	6 26	16 3	2303 572	56 41	5 61	0		
GSCRG		8	0	42	0	77	764	50	39	0	•	
<u>IUIAL</u> #EF®R	2 <u>3435</u> 0	2812 43	30	3607 89	194 10	31	31 <u>536</u> 203		<u>25</u>	<u>0</u>		-
% err	0	6	20	8	28	29	18	****	}}}}	****	- 1	

The above six bands were used for principal component analysis and the error rate measure used to select the best principal axis pairs. The selected axes pairs were:

1-3

1-4

2-4

Using these pairs with the Bayes process produced the following:

Bayes Pa	arameters	,,	% Mis-identification	% False identification
β	α	# categories	, error	error
.028	.4	5 ·	50	36
.0315	.45	5	48	· 51
.035	. 5	5	48	51

Clearly the principal components has not improved over the raw data.

3.5 Supervised Discrimination Summary

The supervised discrimination process has shown poor results so far. Part of the cause may be poor date-to-date and ground truth to image registration. An attempt was made to reduce the effect of mis-registration by shrinking the ground truth regions.

The processing has shown the temporal data to be important, typically choosing images from October, April-May and July for best results. The red (MSS 5) and second Infrared (MSS 7) bands seem to produce the best results.

The Bayes pattern discrimination process has shown wheat to be fairly well classified in all instances (see contingency tables) and grain sorghum tends to be confused with corn, wheat and summer fallow. Summer fallow is confused with almost every other category.

Initial studies with the geometric category modification, shrink-fill, show a decrease by as much as 9% in the error percentage. Further work will be done in this area.

4.0 UNSUPERVISED CLUSTERING

Because of the high error rate in the misclassification of summer fallow and grain sorghum crop types, some unsupervised clustering was performed on four of the LACIE test sites. As the term implies, unsupervised clustering allows the processing of data without apriori knowledge of the ground truth for the area. After the clustering is done, an analysis can be made to see which group corresponds to which category. As a lot of summer fallow fields were being classified as wheat, the ground truth for some of the test sites was a suspect. A study using unsupervised clustering would allow us to check if the spectral signatures of these fields were similar or not. As yet a quantitative analysis has not been done yet, but Figures 4.1a and 4.1b show us a qualitative result of clustering on the Rice and Saline test sites.

In order to understand the clustering process, a brief description of the program follows. The clustering is really done in two steps. In the first section, spatial clustering is performed to determine spectrally homogenous areas in the image. This part of the process involves generating the gradient image, which emphasizes the boundaries. The gradient image is then thresholded. The resolution cells comprising the interior of a field have similar spectral signatures, and thus form a homogenous area. In the gradient image this shows up as low values. On the other hand, at the boundaries of the fields there is large variation in the signature, which corresponds to high gradient values. Thus by single level thresholding of the gradient image and some noise cleaning it is possible to determine the homogenous regions in the image.

The second stage involves the clustering of the homogenous areas which have similar signature. The similarity of signatures is measured by the Eucledian distance function in the multidimensional space defined by the ERTS bands of the original image. This is an iterative process. In each iteration the clusters from the previous iteration are reduced to a smaller number by further grouping, depending on some control parameters that the user enters.

In addition to the functions described in the previous paragraphs, some preprocessing functions like quantization and contrast enhancing were also performed on the image. These tend to improve the result of the spatial clustering routines.

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In the processing of the LACIE test sites two points emerged which bear special mention. The first is directly related to the accuracy of the spatial clustering process. The gradient function is defined to operate on a multiband image, as each of the test site images are. However, using all the bands on all the dates would give a poor result, unless registration of these bands is exact. This certainly is not the case. The IDECS display facilities allows one to compare different bands and/or dates by flickering from one image . to another. On doing so, it was seen that on the average the registration was off by one to two cells, between dates. However, using bands from one date only, though it gives a passable result, does not make use of the additional information that is there. For example, using pre and post wheat harvest dates gives a much better definition of the field boundaries than just one of the dates. Also MSS bands 5 and 7 have a better spatial definition than bands 4 or 6. Thus keeping these points in mind one has to compromise by using as few bands as possible, to minimize registration error, but nevertheless pick enough bands from suitable dates.

The second fact that emerged from this study was that by doubling every resolution cell vertically and horizontally, the result is enhanced considerably. Two sets of clustering were done on the Saline image. One on the original image, while the second on an image which had been expanded by a factor of two both horizontally and vertically. This increased the spatial sampling by a factor of four. It was found that the spatial clustering not only picked up more fields, but the shapes of the fields were better. While this process increases the exection time on the computer, it is of value to work with the expanded image and also to find out if even larger sampling size helps much more or not.

4.1 Unsupervised Clustering of Rice County Image

The spatial clustering for the Rice image was done in quite a different manner than for Morton, Saline and Finney. Instead of using the quantized ERTS bands as data for the process, the first four bands of the spatially expanded principal component image of Rice county were taken. Further a two by two cell rectangular convolution was performed on the image. This was then followed by the clustering steps described above. The spatial clustering generated 155 spectrally homogenous regions which were then clustered down to 17 groups in 8

iterations. Spatial generalization was then performed using the FILL command in KANDIDATS. This involves assigning of labels to unclassified cells based on the category assignments of their neighbors. The final image was compressed by a factor of 2, both horizontally and vertically, to bring it back to its original size. Figure 4.1a shows as this result, as photographed from the IDECS display. Because of lack of contrast on the screen, it is not possible to see all the 17 categories on the photograph. It only serves to give a qualitative idea of the product. For a quantitative analysis either the color display is used, or a line printer map of the region is generated.

4.2 Unsupervised Clustering of Saline County Image

The Saline test site image consists of images registered over three dates as given in Appendix D. For the spatial clustering part only MSS bands 5 and 7 of the July date were chosen. This was because the registration between dates did not seem adequate. For the one date, it was felt that the post harvest picture would be best for showing the fixed boundaries. This process resulted in 506 homogenous regions for the spatially expanded image. This does not mean that there are 506 fields in the image. It is likely that different parts of a field have different signatures, and therefore come up as different regions. This is no problem however, for if the signatures are close enough, the corresponding regions will be put together during the clustering process.

The Euclidean space clustering brought the 506 regions down to 21 classes in 7 iterations. Figure 4.1b shows this image after spatial generalization and compression.

4.3 <u>Unsupervised Clustering of Morton County Image</u>

The Morton county image was also clustered twice. In both cases, spatially expanded images were used. For the first process MSS bands 5 and 7 of the May 9th and July 2nd dates (Appendix C) were chosen, while in the second run MSS bands 5 and 7 of the October and July dates were chosen. In addition a 2x2 convolution was also applied to the data before processing. The spatial results of the two processes were considerably different. The first one yielded 225 regions, while the second gave 607. It is felt this difference

was due to the different dates used. The wheat fields show up quite different on the pre and post harvest images of the second run, than they do in the first. This supports the idea that a judicious choice of dates is important.

For the measurement or Euclidean space clustering for the first run, MSS bands 5 and 7 of May 9th and July 2nd dates were used. However, for the second run bands 5 and 7 for all five dates were used to describe the spectral signature. It should be noted here that any misregistration between dates is not critical for this operation. We are only looking at cells which define the interior or homogenous parts of regions, and not cells at the boundaries, where registration is essential.

For the two runs, 225 and 607 regions were reduced to 35 and 23 classes in 3 and 10 iterations, respectively. Unfortunately, photographs of these two images are not available in time to put in this quarterly report.

4.4 Unsupervised Clustering of Finney County Image

The clustering on the Finney image was performed in a similar manner as the second clustering run for the Morton image. The homogenous region image was obtained using spatially expanded MSS bands 5 and 7 of the October and July dates (Appendix E). This yielded 1148 homogenous regions. For the second stage the signature selection was made from MSS bands 5 and 7 for all five dates. The 1148 regions were grouped into 29 classes in 10 iterations. Photographs of the clustered results were not available in time to put them in this quarterly report.

4.5 <u>Clustering Summary</u>

Spatial clustering has been done for four of the five intensive test sites. A detailed analysis of the clustering results and a comparison of them with the NASA supplied ground truth will be done during the next quarter.

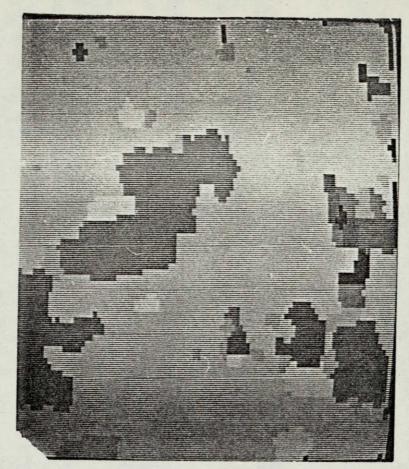


Figure 4.1a



Figure 4.1b

APPENDIX A1

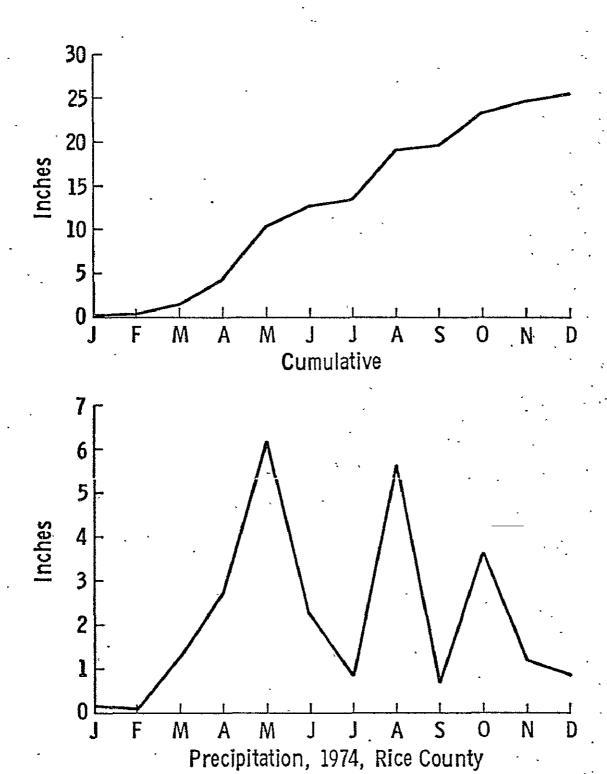
TEST SITES' COORDINATES

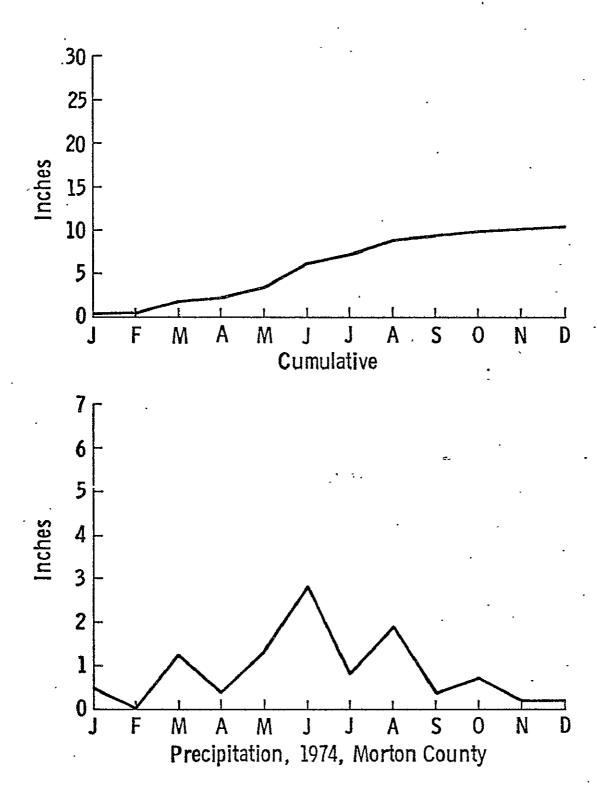
Corners of Sites

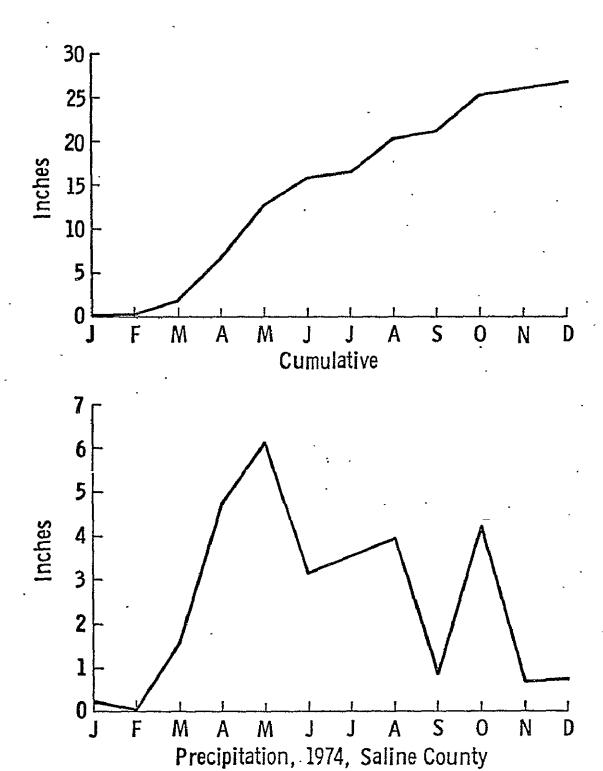
				•	
		NW	NE	sw ·	SE
Counties					
Rice	Lat.	38°18'	38°18°	38 ⁰ 15¹	38 ⁰ 15³
	Long.	98 ⁰ 14'	98°11 '	98 ⁰ 141	98°11'
Morton	Lat.	37 ⁰ 18'	37°18 '	37°13'	37 ⁰ 131
	Long.	101 ⁰ 55'	101 ° 49'	101°55''	101 ⁰ 49'
Saline	Lat.	38 ⁰ 531	38°53°	38°51'	38 ⁰ 511
	Long.	97°30°	97°271	97°30'	97 ⁰ 27 ¹
Finney	Lat.	38 ⁰ 06'	38°06 '	38°02'	38 ⁰ 021
	Long.	101 ⁰ 05'	100°58°	101°05'	100 ⁰ 58'
Ellis	Lat.	38 ⁰ 51'	38°511	38°48'	38 ⁰ 48³
	Long.	99 ⁰ 141	99 ⁰ 11	99 ⁰ 141	11 ⁰ 89

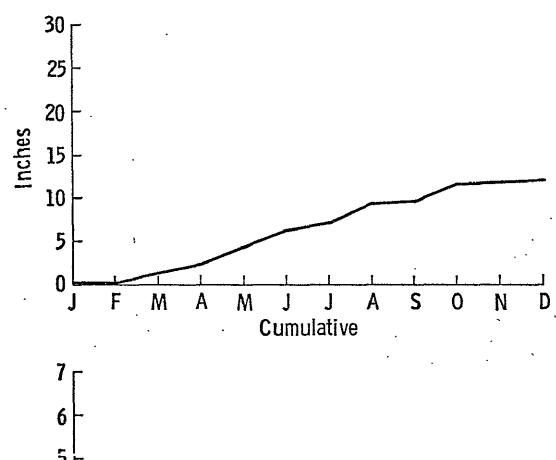
APPENDIX A2

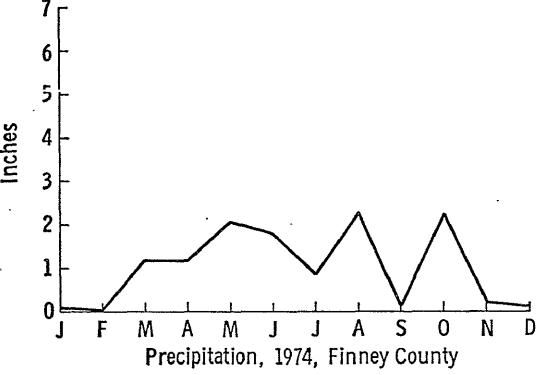
temperature graphs for 1974 for the five test sites.

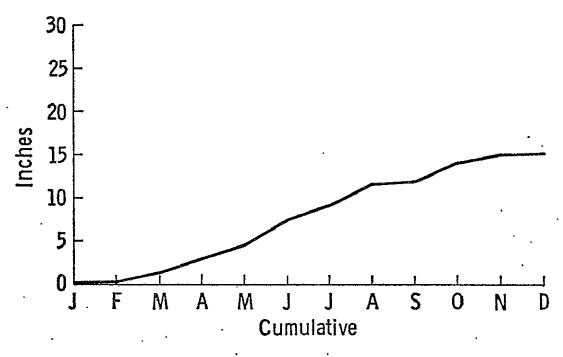


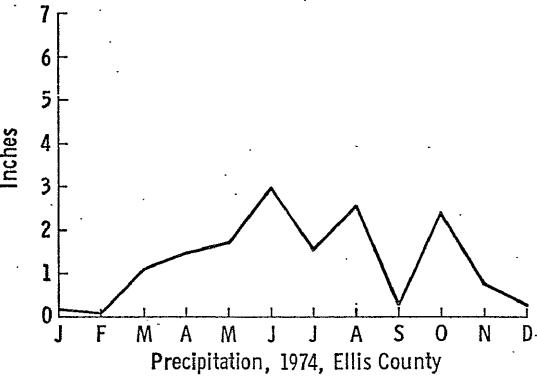


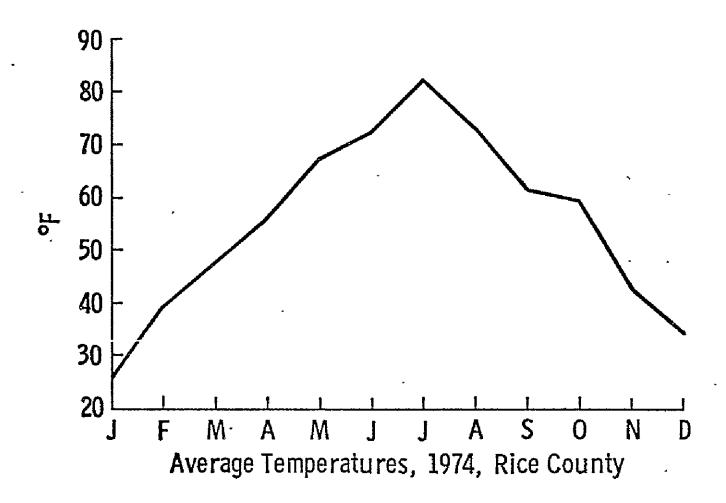


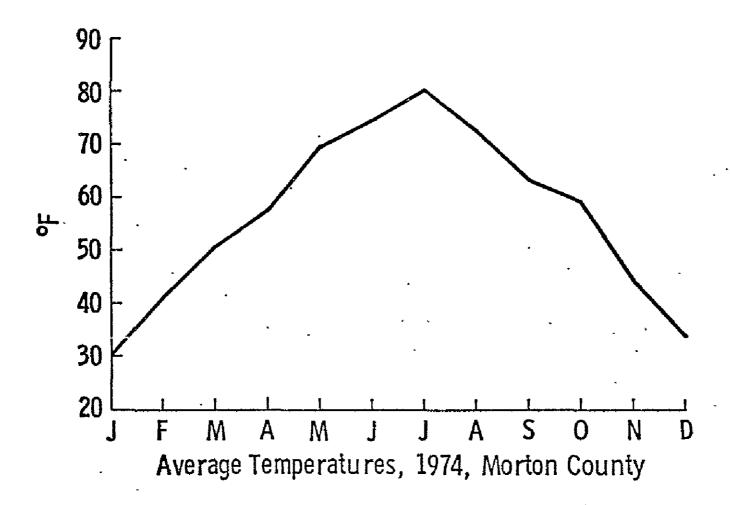


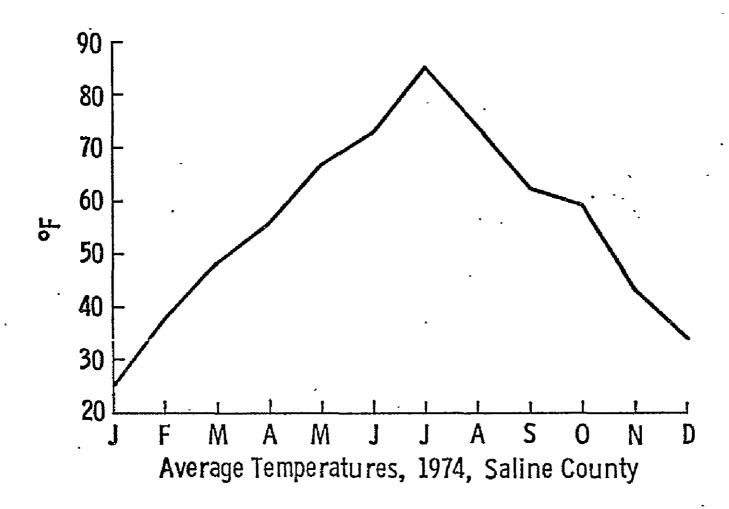


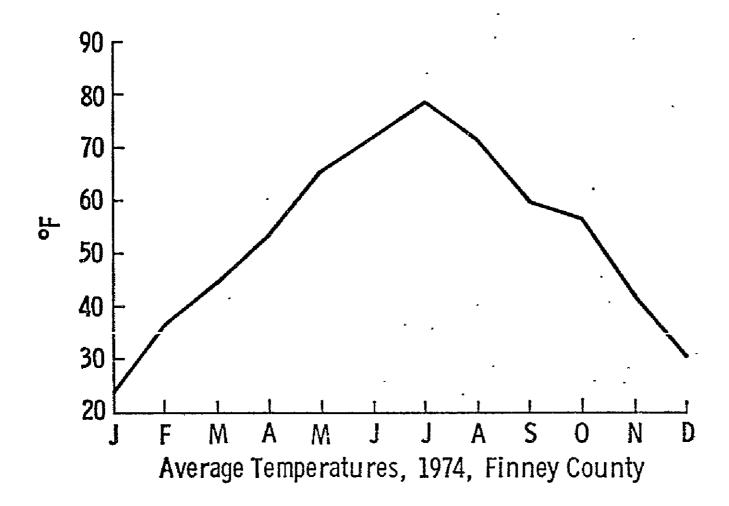


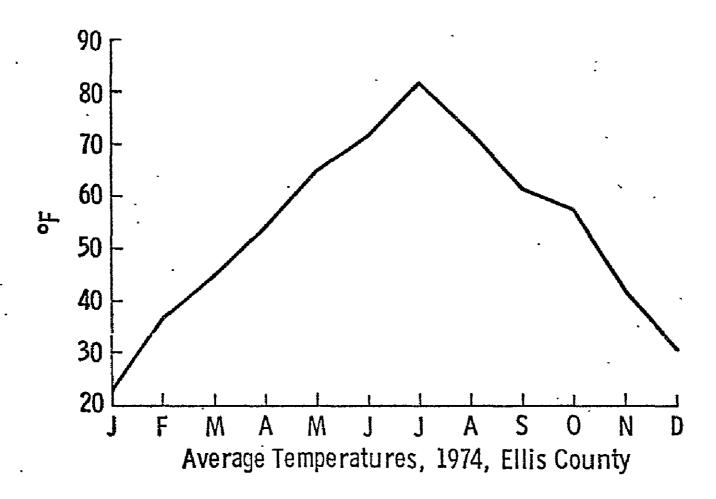












APPENDIX B

Rice County LACIE Intensive Study Site

Computer compatible tape coordinates

FR 230

LR 429

FC 230

LC 429

16 Bands of ERTS data from 4 dates:

October 21, 1973

April 18, 1974

June 12, 1974

July 18, 1974

ERTS observation ID's:

11:55-16:32 [reference scene]

1634-16344

1689-16382

1725-16374

Rotation and distortion parameters for ground truth bands to overly ERTS bands.

+ 16.5° Rotation

Vertical Stretch

.0875 pel/pel at upper left.

Horizontal Stretch

.05714 pel/pel at upper left.

Soil types taken from map of Rice County reconnaissance soil conservation survey from Soil Conservation Service, Washington, D. C., 1946.

Crop types were identified from land use data collected by ASCS, June, 1974, prepared by FSO, Cartographic Laboratory Earth Observation Division, S&AD JSC/NASA, Houston, Texas, September 1974.

APPENDIX BB1 Discriminant Analysis of RICE County Using Original Raw Data

	BHDP7M = STEPWISE DISCRIMINANT ANALYSIS:
	HEALTH SCIENCES COMPUTING FACILITY
	UNIVERSITY OF CALIFORNIA? LOS ANGELES
	The street of th
	IN THIS VERSION OF SMDP7M
	GROUP CODES OF CUTPOINTS HUST BE STATED:
	PROGRAM CONTROL INFORMATION
	PROPLEM TITLE = IRICE CO SAMP, 1:1,/
	INPUT
	VAPIABLE = 20;
	FORMAT = 1(245,1255,07655,071)
	CASE = 660,
	UNIT = 12./
	VARIAB ADD = 1. NAME = TROWY, COLUMNITE 40(1) 1850(1) 1860(1) 1870(1) 184021,
	185D21,186D21,187D21,184D31,185D31,186D31,187D31,184D41,185D41,
1	H6D41, 167D41, 1CROP TYP1, ISOIL TYP1, 1CROP SOLI,
	USE = 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,20,
	LAREL # 1,2,
	GROUP = ICROP TYPI:/
	GROUP CODE = 1,273,4,5,8
•	NAME = :WINTWMET:, :GRASS:,:CORN:,:SUMFALO:,
	INON AGRITGRASORGIT
	TRANSFORMATION
	X(21) = X(19) \$X(20),/ SAVE
••	UNIT = 10.
	CODE = TRICE COT:
-	LAPEL = IRICE CO SAMPLE T RAN DATATIV
	PRINT STEP.
	CLASS = 1,2,3,4,5,6,7,6,9,10,11,12,13,14,15,7
_	PLOT CANON.
	GROUP ="1,2,3,4,5,8,"
	GROUP = 1,2,3,4,8,/
	DISCRIMINANT HETHOD = 2, FORCE = 0,
	STEP = 40.
	JACK:/
	END
-	
	PROBLEM TITLE : ; ; ; ; RICE CO SAMP, 1;
	ANNOUNCE AND THE TO BE TO THE
	NUMBER OF VARIABLES TO READ IN:
	NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS, 1 TOTAL NUMBER OF VARIABLES 21
	NUMBER OF CASES TO PEAD IN. , , , , , , , 660
	CASE LABELING VARIABLES
	LIMITS AND HISSING TVALUE CHECKED BEFORE TRANSFORMATIONS
	INPUT UNIT NUMBER : : : : : : : : :
•	REWIND INPUT UNIT PRICE TO READING . DATA YES
	INPUT FORMAT
	(2A5,12F5,0/6F5,0)

INTERPRETIVE TRANSFORMATIONS ARE

VARIABLES TO	RE USED 3 84D1	4 851		5 B6D1	. 6	B701	7 841	12
· 	8 95D2	9 66		10 8702	-	-84D3	12 85	
1		14 E7	03	15 8404	16	B504	17 851	
1	8 8704	20 50	IE YYP			 , 	N	
TOUERANCE	1 1 1 1 1 1	0,010					· · · · · · · · · · · · · · · · · · ·	<u> </u>
F-TO-ENTER	1 1 1 1 1	4,600						•
F-TO-REHOVE,	1 1 1 1 1 1	3,996						
MAXIMUM FORCED	CEVEL	<u>5</u>						
MAXINUM NUMBER	PF STEPS	40	_					
PRIOR-PROBABILI	TIES,	0,16667	0,16667	0.15657	0,16867	0,16667	0,16667	
		TRANSFORMA"					ERYAL RANGE	
VARIABLE	німінпн	MAXIMUM	MISSING	CATEGORY				
_ NO!NYHE	LIMIT	LIMIT-	-CCDE		KAME	THAN-	OR E	ՆԱՆ Т
19CROP-TYP-				- 1,0 0000		T		
,,,,				\$,00000				
**************************************	<u> </u>			3100000	CORN			
				<u> </u>				
				2.0000				
				00000;3	GRASORG		*	<u> </u>
		•						

Note: In this appendix and others that follow, the following notation is used —
B4D1 stands for MSS Band 4 on Date 1, B5D2 stands for MSS Band 5 on Date 2, etc.

T GROUP #	MINTWHET	GRASS-	CORN	SURFACE	NOW AGR	GRASORG	XLC GF
ARIABLE		······		·	64 74400	23:09170	23,77727
3 B4D1 "	" " 25 ₁ 50633 " "	22;81250	22,47059	22,48077	21.71429		
4 85D1	24,66245	19,93750	20.23529	19,59615	j8,71429	26,48635	21, ⁹ 3636
5 R601	29,10127	77,31250	23;22689	24;84615 12,80769	22,71429	26;03493 13,39738	76,53192 13,50000
6 87D1	14.78059	14143750	11,42017		11.85714	36,91265	3575757
7 A402	34,67089	34,93750	34,95798	35,76923	33,00000		36,3737375 36,37333
8 95p2	33,84388	35,00000	36,85714	36,09615	33,14256	39,02520	46,91001
9 B6D2	49,47257	45,93750	46,39496	47 38461	48,71429	47,51965	24,3/81/
10 B702	26,51008	24,75000	20,35294	24,50000	26.00000		33,59789
11 B4D3	32,85654	31,875go-	31,12605	33,634(1	33;71429	35,72726	
12 8503	32,75949	28,81250	27,69748	34,55769	34,14266	37,77729	33,6484° 40,9772°
13. B6D3	38,79747	41,75000	43,39655	38,48077	39757143 18.71429	42,53712 20,17031	19,8515
14 B7D3	18,59916	20,37500	22,49739	18,11538		•	:36.5°13;
15 B4D4	39,45992	35,37500	30 27731	7769	37,42857	36,37555	37 t P 8 D 7 1
16 B5D4	43,65401	35 31250	24,63025	42,55769	41.28571	37,80349	
17 B6D4	48,91561	44 31250	52,45378	45,80769	44.857 <u>1</u> 4	45 752402	48, <u>0</u> 48 <u>-</u> 19
18 8704	23,86920	22,81250	30,42657	22,50000	21,71429	22,61135	24,45959
20 SOIL TYP	7,43038	7;31250	2,51261	2,46154	2:42857	2,27258	213269
19 CROP TYP	1,00000	5,00000	3,00000	4,00000	5,00000	E;00000	4,09242
OUNTS	237.	16;	119;	52,	7,	229;	660:
STANDARD DE	VIATIONS						
GROUP #	WINTUHET	GRASS	CORN	SUMFALC	NON AGR	GRASORG	ALL G
ARIABLE						.	- -
ARIABLE 3 B4D1	4.88392	3;69177	3.50985	2,33885	2.75162	3:44701	3:9725
ARIABLE 3 B4D1 4 B5D1	4.88392	3;69177 5;84772	3.58985 5.43483	2,33865	2.75162 -3.25137	3,44701	3,9725; 6,1993*
ARIABLE 3 B4D1 4 B5D1 5 B6D1	4,88392 7,55741 7,30671	3,69177 5,84772 6,70044	3.56985 5.43483 6.96777	2,33865 4,16926 4,10349	2.75162 	3,44701 5,42378 6,33970	3:97250
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1	4.88392 7.55741 7.30671 3.74652	3;69177 5;84772 6;70044 4;04918	3.50985 5.43483 6.96777	2,33865 4,16926 4,10349 2,58228	2.75162 	3,44701 5,42378 6,33970 2,79106	3:9725: 6:1993 6:6741: 3:8127
ARIABLE 3 B4D1 4 B5D1 5 D6D1 6 B7D1 7 B4D2	4.88392 7.55741 7.30671 3.74652 4.32294	3,69177 5,84772 6,70044 4,04918 2,64496	3.50985 5.43483 6.96777 4.39857 4.26733	2:33865 4:16926 4:10349 2:58228 4:75937	2.75162 -3.25137 -4.23140 -2.79455 -5.53775	3,44701 5,42378 6,33970 3,79106 4,53942	3:97256 6:1993 6:67413 3:21224
ARIABLE 3 84D1 4 85D1 5 06D1 6 87D1 7 84D2 8 85D2	4,88392 7,55741 7,39671 3,74652 4,32294 8,17013	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316	2.33865 4.16926 4.10349 2.58228 4.75937	2.75162 -3.25137 -4.23140 -2.79455 -5.53775 -9.92352	3,44701 5,42378 6,33970 3,79106 4,53942 5,77093	3:9725; 6:1993; 6:6741; 3:8127; 4:4669; 8:2117;
ARIABLE 3 84D1 4 85D1 5 D6D1 6 87D1 7 84D2 8 85D2 9 86D2	4,88392 7,55741 7,39671 3,74652 4,32294 8,17013 6,22021	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926	2.33865 4:16926 4:10349 2:58228 4:75937 8:49010 6:04283	2.75162 -3.25137 -4.23140 -2.79455 -5.53775 -9.92352 -4.30946	3,44701 5,42378 6,33970 3,79106 4,53942 5,77093 6,47097	3:9725 6:1993 6:6741 3:8127 4:4669 8:2117 6:7083
ARIABLE 3 84D1 4 85D1 5 06D1 6 87D1 7 84D2 8 85D2 9 86D2 10 87D2	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926	2.33865 4.16926 4.10349 2.58228 4.75937 8.49010 6.04283	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398	3,44701 5,42378 6,33970 3,79106 4,53942 5,77093 6,47097	3:97256 6:1793 6:6741 3:8127 4:4667 8:2117 6:7083
ARIABLE 3 B4D1 4 B5D1 5 D6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.88647	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195	2.33865 4.16926 4.10349 2.58228 4.75937 8.49010 6.04263 4.01712 5.15649	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914	3,44701 5,42378 6,33970 3,79106 4,53942 5,77093 6,47097 4,05591 5,47210	3:97256 6:1793 6:6741 3:8127 4:4667 8:2117 6:7083 4:3755 4:8775
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.88647	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493 5,02266	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174	3,44701 5,42378 6,33970 3,79106 4,53942 5,77093 6,47097 4,05591 5,47210	3:97254 6:1793 6:67413 3:81274 4:46676 8:21174 6:70834 4:37556 4:87756
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3	4.88392 7.55741 7.30671 3.74652 4.37294 8.17013 6.22021 4.57002 4.88647 8.44104 8.12046	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493 5,02266 6,65833	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363 6.60009	2.33865 4.16926 4.10349 2.58228 4.75927 8.49010 6.04263 4:01712 5.15649 9.26160	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419	3 44701 5 42378 6 33970 3 79106 4 53942 5 77093 6 47097 4 05591 5 47210 10 02439 8 82404	3:97254 6:1793 6:67413 3:81274 4:46676 8:21174 6:70834 4:87756 4:87756 8:07184
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3 13 B6D3 14 B7D3	4.88392 7.55741 7.30671 3.74652 4.37294 8.17013 6.22021 4.57002 4.88647 8.44104 8.12046	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493 5,02266 6,65833 4,09675	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363 6.60009 3.93779	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649 7.94217 7.94217	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419 3.45033	3 44701 5 42378 6 33970 3 79106 4 53942 5 77093 6 47097 4 05591 5 47210 10 02439 8 82404 4 75282	3:97254 6:1793 6:67413 3:81274 4:46676 8:21174 6:70834 4:87756 4:87756 8:07184
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3 13 B6D3 14 B7D3 15 B4D4	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.88647 8.44104 8.12046 4.47325 4.56630	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58722 4,570493 2,70493 2,70493 3,32415	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363 6.60009 3.93779	2.33865 4.16926 4.10349 2.58228 4.75937 8.49010 6.04283 4:01712 5.15649 9.26180 7.94217 3.93403 4.84834	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419 3.45033 3.73529	3.44701 5.42378 6.33970 79106 4.53942 5.77097 6.47097 4.05591 5.47210 10.02409 8.22404 4.75282 4.43160	3:97254 6:17935 6:67413 3:81276 4:40676 8:21176 6:70836 4:87756 8:07184 4:47841 4:34497
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3 13 B6D3 14 B7D3 15 B4D4	4.80392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.88647 8.44104 8.42046 4.47025 4.56630	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28728 2,70495 5,05833 4,09675 3,32415 6,03013	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363 6.28363 6.28363 6.3926 3.50195 6.28363 6.28363 6.3926	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649 9.26160 7.94217 	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419 3.45033 3.73529 6.65117	3.44701 5.42378 6.33970 79106 4.53942 5.77097 4.47591 5.47591 5.47591 5.47210 10.22404 4.75282 4.75282 4.75282 4.75282	3:97254 6:1793 6:67413 3:81274 4:46676 8:21174 6:70834 4:87756 4:87756 8:07184 4:47841 4:34497
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3 13 B6D3 14 B7D3 15 B4D4 16 B5D4 17 B6D4	4.80392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.86647 8.44104 8.447025 4.56630 8.23480 7.22704	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493 5,02266 6,5833 4,09675 3,32415 6,15596	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.37956 3.50195 6.28363 6.60009 3.93779 3.56519 7.18150 6.07125	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649 7.26160	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419 3.45033 3.73529 6.65117 6.36209	3.44701 5.42378 6.33970 79106 4.53942 5.77097 4.05991 5.47097 4.0439 6.2404 4.75282 4.75282 4.75282 4.75282 4.75282 7.13931	3:97254 6:1793 6:67413 3:41274 4:46676 8:21177 6:70837 4:37556 4:87756 8:07184 4:47841 4:34497 8:07856 6:87773
ARIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 B5D2 9 B6D2 10 B7D2 11 B4D3 12 B5D3 13 B6D3 14 B7D3 15 B4D4 16 B5D4 17 B6D4 18 B7D4	4.8ñ392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.86647 8.44104 8.12046 4.7025 4.56630 8.23480 7.22704 3.98989	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28728 2,70493 5,05833 4,09675 3,32415 6,15596 0,15596	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.32926 4.37556 3.50195 6.28363 6.28363 6.28363 6.36519 7.18150 6.07125 5.16601	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649 9.726160 7.724217 3.93403 4.84834 8.48161 5.98704 2.63169	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.163914 6.09174 6.09174 6.745033 3.73529 6.36209 3.25137	3.44701 5.42378 6.33970 3.79106 4.53942 5.77097 4.05991 5.47097 4.05991 0.72409 10.72409 10.75282 4.75282 4.75282 4.75282 4.75282 4.75282 4.75282 4.75282 4.75282 4.75282	3:97254 6:17935 6:67413 3:81276 4:46676 8:21176 6:70836 4:87756 8:07184 4:34497 8:07856 6:87773
ARIABLE 3 84D1 4 85D1 5 86D1 6 87D1 7 84D2 8 85D2 9 86D2 10 87D2 11 84D3 12 85D3 13 86D3 14 87D3 15 84D4 16 85D4 17 86D4	4.80392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.86647 8.44104 8.447025 4.56630 8.23480 7.22704	3,69177 5,84772 6,70044 4,04918 2,64496 5,05964 6,28722 4,58258 2,70493 5,02266 6,5833 4,09675 3,32415 6,15596	3.50985 5.43483 6.96777 4.39857 4.26733 7.22316 6.37956 3.50195 6.28363 6.60009 3.93779 3.56519 7.18150 6.07125	2.33865 4.16926 4.10349 2.56228 4.75937 8.49010 6.04263 4:01712 5.15649 7.26160	2.75162 3.25137 4.23140 2.79455 5.53775 9.92352 4.30946 5.16398 5.52914 8.09174 6.75419 3.45033 3.73529 6.65117 6.36209	3.44701 5.42378 6.33970 79106 4.53942 5.77097 4.05991 5.47097 4.0439 6.2404 4.75282 4.75282 4.75282 4.75282 4.75282 7.13931	ALL GF 3

AMBIARCE	F TO FORCE REMOVE LEVEL	8	AYSIAB	5	FORCE : : EVEL	TOLERANCE
	F= 5 655	——¥—		DF 8 5 6	54	
		長	3 940	14,59	3 1	1,000000
		Ď.	4. 822	15,64	31	1,000000
		#	5 56D	1 14,28	0 1	1,000000
		75	6 57D			1,00000
		*	7 340			1,00000
		8	\$ 52D.			<u> </u>
		4	9 36D			1,900000
	·	4	10 970			1,000000
,		#	11 34D			1,000000
		Þ				1,000000
		ě	13 36D			1,000000
		¥	:4 87E			1,000000
-		\$	15 862			1,00000
*		Ø	15 550			1,000000
	•	*	17 96D			1,000000
•		٠	18 970			1,000000
		4	20 501	L TYP . 2,74	7 1	1,000000

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

STEP NUMBER VARIABLE ENT		Y.	MNO 7	05/12	<u> </u>	
VARIABLE	F TO FOR		VARIABLE	F TO FORC	,	
	REMOVE LEV	EL *		ENTER LEVE	<u></u>	
	DF 5 649			F= 5 648		
4 B5D1	7,956	*	3.9401	0,602 [0,374 L	0,091205	
6 8701 10 8702	4,899 1		5 86D1. 7 90D2	2:343	0,061799 	
12 8503	7.143 1 17.955 1	*	8 85D2	2:936	0,759891	
16 65D4			-9. B9D5		0,158665	
18 B7D4	53,201 1	a a	11 84D3	2,018	0,078758	
		*	13 A6D3	7,139	0,451416	
		#	14 9703	2,041 1	0,600939	
		\$	15 8404	0,847	0,071698	•
		A	17 B6D4	1,186 l	0,035686	
		A	~29~S0IU~TYP	2,157-1	0,855998	
F - MATRIX		DF FREEDOM :	6 649	S OF FREEDOM	30,00 ` 2598.	00
F - PATRIX	DEGREES WINTWH GRAS	OF FREEDOM :	6 649	S OF FREEDOM	30,00 \ 2598.	
F - MATRIX	DEGREES WINTWH GRAS 4.04 41.99 19.83	OF FREEDOM :	6 649		30,00 \ 2598.	
GRASS CORN SOMFAU	DEGREES WINTWH GRAS 4.04 141.99 19.83 6,82 4,41	OF FREEDOM : S CORN 72,81	6 649 SUMFAL N		30,00 \ 2598.	
F - MATRIX GRASS CORN SOMFAU NON AG	DEGREES WINTWH GRAS 4.04 141.99 19.83 6.82 4.41 1.52 1.73	OF FREEDOM : S CORN 72,81 14,41	= 6 649 SUMFAL N	ON AG	30,00 \ 2598.	
GRASS CORN SOMFAU	DEGREES WINTWH GRAS 4.04 141.99 19.83 6,82 4,41	OF FREEDOM : S CORN 72,81	6 649 SUMFAL N	ON AG	30,00 \ 2598.	00
GRASS TO CORN SOMFAU NON AG GPASOR	DEGREES WINTWH GRAS 4.04 141.99 19.83 6.82 4.41 1.52 1.73	OF FREEDOM : S CORN 72,81 14,41	= 6 649 SUMFAL N	ON AG	36,00 \ 2598.	00
F - MATRIX GRASS CORN SOMFAL MON AG GPASOR CLASSIFICAT	DEGREES WINTWH GRAS 4.04 141.99 19.83 6,82 4.41 1.52 1.73 22.90 4.48	OF FREEDOM : S CORN 72,81 14,41	= 6 649 SUMFAL N	ON AG	30,00 \ 2598.	GRASCRG
F - MATRIX GRASS CORN SOMFAL MON AG GRASOR CLASSIFICAT VARIABLE	DEGREES WINTWH GRAS 4,04 41,09 19,83 6,82 4,41 1,52 1,73 22,90 4,48	OF FREEDOM : S	5,02 0,41 corn	97	NON AGR	GRASORG
F - MATRIX GRASS CORN SOMFAU NON AG GPASOR CLASSIFICATI GROUP VARIABLE 4 8501	DEGREES WINTWH GRAS 4,04 41,09 19,83 6,72 4,41 1,52 1,73 22,90 4,48 ON FUNCTIONS DP = WINTWHET	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS	5,02 0,17085	97 	NON AGR	GRASORG C. C1966
F - MATRIX GRASS CORN SOMFAU MON AG GPASOR CLASSIFICAT VARIABLE 4 8501 6 8701	DEGREES WINTWH GRAS 4,04 14,04 14,09 19,83 6,72 4,41 1,52 1,73 22,90 4,48 ION FUNCTIONS JP = WINTWHET 0,05471 0,26827	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS -0,05205 0,42131	6 649 SUMFAL N 0:41 5:02 CORN 0:17085 0:05637	97 SUFALT -0,06965 0,21681	NON AGR	GRASORG C. C1566 C. 15968
F - MATRIX GRASS CORN SOMFAU NON AG GPASOR CLASSIFICAT: VARIABLE 4 8571 6 8771 10 8772	DEGREES WINTWH GRAS 4.04 141.99 19.83 6,72 4.41 1.52 1.73 22.90 4.48 CON FUNCTIONS DP = WINTWHET 0.05471 0.26827 0.71167	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS 0:05205 0:42131 0:74985	CORN C0:41 5:02 CORN C:17085 C:05637 C:45993	97 SUFALT -0.06965 0.21681 0.63085	NON AGR -0.07325 0.14272 0.78107	GRASORG C. C1566 C. 15968 C. 66649
F - MATRIX GRASS CORN SOMFAU NON AG GPASOR CLASSIFICAT: VARIABLE 4 8501 6 8701 10 8702 12 8503	DEGREES WINTWH GRAS 4,04 141,09 19.83 6,72 4,41 1,52 1.73 22.90 4,48 CON FUNCTIONS DP = WINTWHET 0.05471 0.26827 0.71167 0.32629	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS 0,05205 0,42131 0,74985 0,25816	CORN 0,41 5,02 0,17085 0,17085 0,15637 0,45993 0,26652	97 SUPFALI -0,06965 0,21681 0,63083 0,36275	NON AGR - 0.97325 - 0.14272 - 0.76107 - 0.36743	GRASORG C. C1566 C. 15968 C. 66649 C. 40751
F - PATRIX GRASS CORN SOMFAU NON AG GPASOR CLASSIFICAT: VARIABLE 4 8501 6 8701 10 8702 12 8503 16 8504	DEGREES WINTWH GRAS 4,04 141,99 19.83 6,82 4,41 1,52 1,73 22,90 4,48 ION FUNCTIONS DP = WINTWHET 0.05471 0.26827 0.71167 0.32629 0,40827	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS 6:05205 0:42131 0:74985 0:25816 0:25816	CORN 0,41 5,02 0,17085 0,05637 0,26652 0,12683	97 SUPFAL 3 0,06965 0,21681 0,63087 0,36275 0,46064	NON AGR -0.97323 0.14272 0.78107 0.36743 0.41394	GRASORG C. C1566 C. 15965 C. 66649 C. 40761 C. 35C39
F - MATRIX GRASS CORN SOMFAU NON AG GPASOR CLASSIFICAT VARIABLE 4 B5D1 6 B7D1 16 B7D2 12 B5D3	DEGREES WINTWH GRAS 4,04 141,09 19.83 6,72 4,41 1,52 1.73 22.90 4,48 CON FUNCTIONS DP = WINTWHET 0.05471 0.26827 0.71167 0.32629	OF FREEDOM: S CORN 72,81 14,41 127,45 GRASS 0,05205 0,42131 0,74985 0,25816	CORN 0,41 5,02 0,17085 0,17085 0,15637 0,45993 0,26652	97 SUPFAL 3 -0,06965 0,21681 0,45085 0,36275 0,46064	NON AGR - 0.97325 - 0.14272 - 0.76107 - 0.36743	GRASORG C. C1566 C. 15968 C. 66649 C. 40751

SROUP	PERCENT CORRECT	ипивЕ	R OF CASES	CLASSIFIE	D INTO GRO	CP =	·····
		WINTW	HET GRASS		SUME_7[0_	~ DA~V 0 / ~	
WINTWHET	40,5	96	31	1:	38	26	35
GRASS	76,5	4	15	91	3	1	5
"SUMFALTO"	32,7	7	3	1	17	10	14
NON AGR	42,9	C	1		2	3	1
GRASORG	43,7	25	39	5	35	_58	100
	D CLASSIF	133 TCATION	97	107	98	.69	156
TOTAL Jackknife Group		TCATION	-				156
JACKKNIFE	PERCENT CORRECT	TCATIONNUHBE	<u> </u>			OUP = -	156 GRASORG
JACKKNIFE	PERCENT CORRECT 39.7	TCATION	R OF CASES	CLASSIFTE	D INTO GAC	10P =	
JACKKNIFE GROUP	PERCENT CORRECT 39.7 37.5	TCATIONNUHBE	R OF CASES HET GRASS 31	CLASSIFTE CCRN 12	D INTO GRO	OUP = -	GRASORG 35
JACKKNIFE GROUP	PERCENT CORRECT 39.7 37.5 75.6	TCATIONNUHBE	R OF CASES HET GRASS 31	CLASSIFIE	SUMFALO 38 4 3	OUP = -	GRASORG 35 1 5
JACKKNIFE GROUP WINTWHET GRASS CORN SUHFALO	PERCENT CORRECT 39.7 37.5 75.6	TCATIONNUHBE	R OF CASES HET GRASS 31	CLASSIFTE CCRN 12	D INTO GRO	OUP = -	GRASORG 35
JACKKNIFE GROUP	D CLASSIF PERCENT CORRECT 39.7	TCATIONNUHBE	R OF CASES HET GRASS 31 6 16 3	CLASSIFTE CCRN 12	SUMFALO 38 4 3 15 3	VON AGR 27 2 1 11	GRASORG 35 1 5 15
JACKKNIFE GROUP WINTWHET GRASS CORN SUHFALO	PERCENT CORRECT 39.7 37.5 75.6	TCATIONNUHBE	R OF CASES HET GRASS 31 6	CLASSIFTE CCRN 12	SUMFALO 38 4 3	VON AGR 27 2	GRASORG 35 1 5

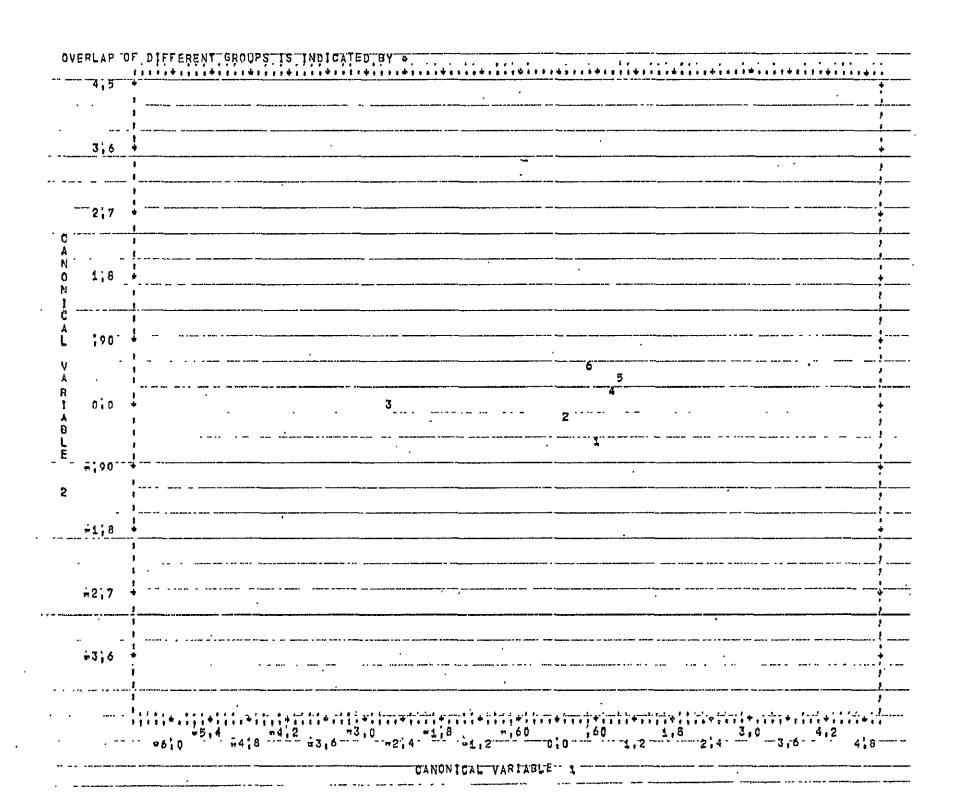
STEP		VARI	ABLE	F VALUE TO	KU 4EER OF	U-STATISTIC	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
NUMBER		ENTEPED	REMOVED	ENTER OF REMOVE	VARIABLES INCLUDED		F-STATISTIC
1	16	P5D4	······································	93.4517	1	0.5833	731452
2	18	e7D4		52,6907	2	0,4156	71.994
3	<u> 12</u>	8503		2019253	3	0,3581	54,030
4	4	55Dj		5.459 <i>9</i>	4	0;3363	42,014
5	10	R702		7,5480	- 5	0,3176	34,750
6	6	B7D1		4 8968	ó	0,3060	29,832

Percent of Variation Between Groups Explained

Eigenvalues	1.53071	0.21092	0.03385	0.02832	0.00293
Percentage	84.72	11.67	1.87	1.57	0.16
Canonical Correla	itions				
	0.7772	0.41735	0.18094	0.16595	0.05406

VARIABLE	COEFFICIENT	TO FUH CANON	ICAL VARIABLE	: S ————	· · · · · · · · · · · · · · · · · · ·
4 B5D1	- n,04654	-0,04834	0,13858	÷0,07601	+0,02882
6 B7Di	0.05429	-0. ñ7122	0,01412	0,18339	7520310
10 B702.	0,07034	-a, n35 13	0.07351	0,10394	+0,20231
12 8503			0,05281	-0.06415	
16 85D4	0.08263	=0,03455	-0.08581	-0,07210	0,04491
18 8704	=0;17131	0.06695	~~0;05022""	≃0,10976	0, <u></u> 2306
CONSTANT	- =1:34590	3,16445	-2,30597	4,03609	0,54621
GROUP	CANONICAL VAR	MABLES FVACU	TATED AT GROU	P HEANS -	
WINTWHET	0,64311	in 53704	0,05662	=0,03145	0,0G198
GRASS	0.09584	— ≨o;i7488″″	0117418	1.03864	0ic4672
CORN	-2,61081	F0:04512	-0,02348	-0.02567	-0.00277
SUMFALO	0,82440	0.19477	-0,56549	-0.12632	0,0528
NON AGR	0,93682	0.31443	-0,4641 <u>7</u>	0,12950	≈0,49745
GRASORG		6.53703	0:10837	-0.00192	0,00344

GROUP	Mean Coordinates		Symbol for Classes	Symbol for Mean
Winter wheat	0.64	-0.54	Α	1
Grass	0.10	-0.17	В	2
Corn	-2.61	-0.05	С	3
Summer Fallow	0.82	0.19	D	4
Non-agriculture	0.94	0.31	E,	5
Grain sorghum	0.47	0.54	F	6



APPENDIX BB2

Discriminant Analysis of RICE County Using Residuals From ERTS Bands Regressed on Soil Type

Transformations of Original Variables

	SUBRCUTINE TRANSF(X, KASE, NPROG, USE) COMMON/GETCME/PAD(17),XMIS
3	OIMENSICH X(1)
	X(3) = X(3) - (1.133163*X(20) + 21.061115)
, 5	$X(4) = X(4) - (1.885455 \times X(21) + 17.316985)$
6	X(5) = Y(5) - (2.376673+X(20) + 19.396823)
7	X(6) = X(5) - (1.714957*X(2() + 9.389300)
8	X(7) = X(7) - (9.676121*X(20) + 33.955117)
9	X(8) = X(8) - (1.23/607*X(20) +_33.296979)
16	X(9) = X(9) - (2.496556*Y(20) + 40.915830)
11	X(19) = X(10) - (1.383968*X(20) + 21.050853)
12	X(11) = X(11) - (0.776229*X(20) + 31.727231)
13	X(12) = X(12) - (1.903983*X(20) + 29.084695)
14	X(13) = X(13) - (2.403371*X(20) + 35.216465)
15	X(14) = X(14) - (1.337328*X(20) + 16.645980)
16	X(17) = X(17) - (3.294544*X(20) + 40.171258)
17	X(18) = X(18) - (2.165488*X(20) + 19.268482)
18	RETURN
19	END

BMCP7M - STEPWISE DISCRIMINANT ANALYSIS. HEALTH SCIENCES COMPUTING FACILITY	MANUAL DATE 1975
UNIVERSITY OF CALIFORNIA, LOS ANGELES	
IN THIS VERSION OF BMDP7M GFOUP COCES OR CUTPOINTS MUST BE STATED.	·
PROGRAM CONTROL INFORMATION	
PROBLEM TITLS = "RICE CO ERTS BANDS & GROUND TRUTH USING RESIDUALS	00001170
FROM ERTS BANDS REGRESSED ON SOIL TYPE ./	00001180
INPUT-	00001190
VAFIABLE = 20.	00601200
FORMAT = '(?A5,12F5.0/6F5.0)'.	
CASE = 660.	000C1220 00001230
UNIT = 12./ VARIAB ADD = 1.	30001230
NAME = "RCh". *CCLUMN", "B4D1", "B501", *B6D1", *B701", *B4D2",	GD8G1258
'0982', '8602', '8702', '8403', '8903', '8603', '8703', '8494', '3504',	
'B654', '2704', 'CROP TYP', 'SOIL TYP', 'CROP*SOL'.	00901270
USE = 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	00001263
LACEL = 1.7.	00001290
GROLP = 'CROP TYP'./	0001300
TRANSFORMATION	00081310
y(21) = y(19)*x(20),	00001320
GROUP GOUL = 1,2,3,4,5,8.	00001330
GROUP COUL = 1,2,3,4,5,8. NAFO = "WINTWHET", "GRASS", "CORN", "SUMFALO", "NON AGG", "GPASORG"./	00301340 00901350
PRINT ST. P.	00001360
CLASS = 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15./	
PLOT CANON.	00001360
GRCUP = 1,2,3,4,5,8.	
GROUP = 1,2,3,4,8.7 DISCFIMINANT MUTHOD = 2.	00001400
DISCFIVINANT MUTHOD = 2.	00001410
! OKDE = 0.	00001420
STFP =, 40.	00001436
JACK./	00001440
[HD/	00001450
PRUBLEM TITLE	RESIDUALS FROM ERTS BANDS REGRESSED ON SOIL
NUMBER OF VARIABLES TO FEAD IN	
HUNBER OF VARIABLES ADDEC BY TRANSFORMATIONS 1 TOTAL NUMBER OF VARIABLES 21	
NUMBER OF CASES TO READ IN	
. CASE LABOLING VARIABLES ROW COLUMN	
LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS	
INFUT UNIT NUMBER	A 4 A MANUAL MAN
REWIND IMPUT UNIT PRIOR TO READING DATA YES	·
THOUT FORMST	•
INPUT FORMAT (2A5,12F5.0/6F5.0)	بر نصو سبحه به سامه و خصور من فحم محمد محمد بازن و برند و خطور ازن و برند و ازن و ازن و ازن و ازن و ازن و ازن و
PERSONAL SAME OF ALL	
	*
INTERPRETIVE TRANSFORMATIONS ARE	
CKOP*SOL = CROP TYP * SOIL TYP.	
	k k

	3 B401	4 850	11	""``5	601 T	6	6701	7	2402
	१ 85 7 2	9 950	2	10 8	702	11	8403	12	2503
	13 8603	14 370	3	15 B	404	16	8504	17	8604
	18 B704					 			
FCLERANCE		0.013	* -					-	
F-TC-ENTIR		4.683							
E-TO-PENOVE	· · · · · · · · · · · · · · · · · · ·	3.996							
COHTEM		2							
MAXIMUM FORCEC									
MAXIMUM NUMBER		40							
PRIOR PROBABIL	ITIES	0.16667	0.16667	0.16	657	0.15667	C.16667	0.1566	7
•	BEFORE	TRANSFORMAT	'ION				INT	ERVAL RA	NGE
VARIAELE	MINIMUM	MUMIXAK	MISSING	CAT	EGORY	CATEGORY			ESS THAN
_NO. NAME	LIMIT	LIMIT	CODE		E	<u>name</u>	THAN	0	R EQUAL TO
19 CFOP TYE				1.	02583	hintmet	-		
				2.	03000	6255			
				3.	00000	COMM			
		-		4.	00000	SUMFALO			,
					09666				
·				8.	00000	GRASORG		-	

GROUP ≃ VARIABLE	WINTWHET	GRA S3	CORN	SUMFALO	NON AGE	GRASORG	ALL G
3 B491	1.69120		-1.43772	-1.36962	-2,09880	-0.56727	0.000
4 B5C1	2.76309	-1.73960	-1.81909	-2.36193	-3.18166	-1-15919	0.0000
5 P6[1	2.47000	1.03212	-3.64914	-1.8778	-3,91160	-9.18514	0.0000
6 B7C1	1,22329	1.38236	-2.27814	-0.8030	-1.59785	C. 87641	0.0000
7 9452	-0.92746	-0.58115	-6.69596	0,14982	-2,59713	1.40749	-0.0000
8 8302	-2.58247	-1,27+57	0.32492	-0.37032	-3.25117	2,77728	-0.3368
9 8602	2.49916	-0.75162	-6.79373	0.3234?	1.73539	0.88028	0.0060
10 8762	2 • 12 566	0.49972	-4.17528	0.04243	1,58858	-C.12327	-0.0000
11 B4C3	-0.75727 .	-1.64731	-2.55159	-0.00330	0.10188	2. 22241	0.0000
12 8503	-0.95268	-4.67516	-6.17117	3.78627	0.43429	4.32757	0.0057
13 8673	-2.26619	8.97574	2.13137	-2.65163	-1.48179	1.61074	0.3669
14 8703	-1.29724	0.63645	2.48124	-1.82243	-1,17949	0.45840	0.0000
15 8404	39+45992	35.37500	30.27731	39.05759	37.42857	36. 37555	36.5818
16 0904	43.65401	35.31250	24.63025	42.55761	41.28571	37.20349	37.3863
17 B6C4	0.73736	-2.9/739	4.01464	-1.47321	~ 3. 31515	-2.20023	0.0966
18 0704	-0.66224	-1.46367	5.71907	-2.09891	-2.81324	-1.62168	-0.0060
19 CFOP TYP	1.00007	2.00000	3.00000	4.0000)	5.00000	8.00000	4.0924
19 CFOP 11P	140000.						
CUNTS	237.	16.	119.	52.	7.	229.	666.
CUNTS STANDAPO DE	237. V 34ŤICNS						
CUNTS	237.	16. GRASS	119. CORN	52. SUMFALO	7. NON AGR	229. GRA SORG	
CUNTS STANDAPO DE GROUP =	237. RMJITAEV						ALL G
CUNTS STANDARD DE GROUP =	237. V JAŤICNS WINTWHIT 4.78255	GRASS 3.91058	CORN	SUMFALO	NON AGR	GRA SORS	ALL G
STANDARD DE GROUP = GROUP = JARIJELE 3 8471 4 8501	237. VJAŤICNS WINTWHET 4.78255 7.37039	GRASS	CORN 3.49216 "	SUMFALO 2.32353	NON AGR 2.39269	GRA SORS	ALL G 3.9164 6.1092
CUNTS STANDARD DE GROUP = ARIJELE 3 8471	237. V JAŤICNS WINTWHIT 4.78255	GRASS 3.91058 6.26144	CORN 3.49216 5.35003	SUMFALO 2.32353 4.26483	NON AGR 2.39269 2.92138	GRA SORS 3. 41912 5. 46989	ALL G 3.9164 6.1092 6.4188
CUNTS STANDARD DE GROUP = ARIFELE 3 8471 4 8501 5 9661	237. VJATICNS WINTWHIT 4.78255 7.37039 6.94452	GRASS 3.91058 6.26144 6.57121	CORN 3.49216 5.35003 6.67597	SUMFALO 2.32353 4.26485 4.10985	NON AGR 2.39269 2.92138 3.82-23	GRA SORS 3. 41912 5. 40909 6. 18032	ALL G 3.9164 6.1092 6.4168 3.6582
STANDARD DE STANDARD DE GROUP = GROU	237. VJATIONS WINTWHIT 4.78255 7.37039 6.94452 3.52 594	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569	CORN 3.49216 5.35003 6.67597 4.22024	SUMFALO 2.32355 4.26485 4.10985 2.45033	NON AGR 2.39269 2.92138 3.82-23 2.75878	GRA SORS 3. 41912 5. 40909 6. 18032 3. 69166	ALL G 3.9164 6.1092 6.4188 3.6582 4.3774
CUNTS STANDARD DE GROUP = GROUP = GROUP = 4 8501 5 9611 6 8701 7 6402	237. VJATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54694	GRASS 3.91058 6.26144 6.57121 3.72981	CORN 3.49216 5.35003 6.67597 4.22024 4.15919	SUMFALO 2.32353 4.26485 4.10985 2.48033 4.52090	NON AGR 2.39269 2.92138 3.92-23 2.75878 5.67075	GRA SORÓ 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961	ALL G 3.9164 6.1092 6.4183 3.6582 4.3774 5.1572
CUNTS STANDARD DE GROUP = GROUP = 4 8501 5 9661 6 8761 7 1402 8 3502	237. VJATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54694 4.32642 8.12324	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4.97777	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.36886	SUMFALO 2.32355 4.26485 4.10985 2.48033 4.52090 8.06277	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67075 10.08509	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 80775	ALL G 3.9164 6.1092 6.4188 3.6582 4.3774 5.1572 6.4937
STANDARD DE GROUP = GROUP = GROUP = 3 8401 4 8501 5 9601 7 1 402 8 3502 9 8602 10 6702	237. VJATIONS WINTWHET 4.78255 7.37639 6.94452 3.52499 4.32642 8.12324 5.90198 4.41362	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4,97777 6.07116	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.76866 7.93699	SUMFALO 2.32353 4.26485 4.10985 2.48033 4.52090 8.06277 5.50310	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67005 10.08509 5.28780	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 60706 6. 56883	ALL G 3.9164 6.1092 6.4188 3.6582 4.3774 6.1572 6.4937 4.2364
GUNTS STANDAPO DE GROUP = JARIJELE 3 8401 4 8501 5 9601 6 8701 7 6 402 8 3502 9 8602	237. VJATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54.694 4.32642 8.12324 5.90198	GRASS 3.91058 6.26144 6.57121 3.725569 4,97777 6.07116 4.48343	CORN 3.49216 5.35003 6.67597 4.25924 4.15919 6.76896 7.93699 4.18401	SUMFALO 2.32353 4.26485 4.10985 2.45033 4.52090 8.06277 5.50310 3.93162	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67005 10.08509 5.28780 5.43328	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 69961 6. 60706 6. 60863 4. 66664	ALL G. 3.9164 6.1092 6.4188 3.6582 4.377. 5.157? 6.4937 4.2364
GUNTS STANDARD DE GROUP = GROUP = JARIJELE 3 8471 4 8501 5 9601 7 4402 8 3502 9 8602 10 8702 11 8403	237. VIATIONS WINTWHET 4.78255 7.37039 6.94452 3.5249 4.32642 8.12324 5.90198 4.41362 4.78437	GRASS 3.91058 6.26144 6.57121 3.72581 2.55569 4.97777 6.07116 4.48343 2.66175	CORN 3.49216 5.35003 6.67597 4.2024 4.15919 6.36866 7.93699 4.18401 3.47976	SUMFALO 2.32353 4.26485 4.10985 2.45033 4.52090 8.06277 5.50313 3.93162 5.91387	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67005 10.08509 5.43328 5.57129	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 50863 4. 06664 5. 49157	ALL G. 3.9164 6.1092 6.4188 3.6582 4.377. 5.157? 6.4937 4.2364 4.6338 8.5682
GUNTS STANDARD DE GROUP = GROUP = GROUP = 4 8501 5 9601 6 8701 7 4402 8 3502 9 8602 10 8702 11 8403 12 8503	237. VJATICNS WINTWHIT 4.78255 7.37039 6.94452 3.54 c94 4.32642 8.12324 5.90194 4.41362 4.78437 8.19375 7.82595	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4,97777 6.07116 4.48343 2.66175 4.69190 6.86871	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.36896 7.93699 4.18401 3.47976 6.15974	SUMFALO 2.32353 4.26485 4.10985 2.48633 4.52690 8.06277 5.50313 3.93162 5.01387 8.91805	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67005 10.08509 5.24780 5.57129 8.24544	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 50863 4. 06664 5. 49157 19. 62152	
GUNTS STANDAPO DE GROUP = GROUP = /ARIFELE 3 8471 4 8501 5 9671 6 8701 7 4402 8 8502 9 8602 10 8772 11 8403 12 8503 13 8603	237. VJATICNS WINTWHET 4.78255 7.37039 6.94452 3.54 c94 4.32642 8.12324 5.90198 4.41362 4.78437 8.19375	GRASS 3.91058 6.26144 6.57121 3.72569 4.97777 6.07116 4.48343 2.66175 4.69190	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.76896 7.9%699 4.18401 3.47976 6.15974 6.349-0	SUMFALO 2.32353 4.26485 4.10985 2.48633 4.52090 8.06277 5.50313 3.93182 5.01387 8.91875 7.80852	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67005 10.08509 5.24780 5.57129 6.24944 7.20050	GRA SORS 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 50705 6. 50863 4. 5664 5. 49157 19. 62152 8. 63024	ALL G 3.9164 6.1092 6.4188 3.6582 4.3774 6.1577 6.4937 4.2834 4.8338 8.5682 7.9291 4.3515
GUNTS STANDAPO DE GROUP = JARIJELE 3 8401 4 8501 5 9601 6 8701 7 1402 8 3502 9 8602 10 8702 11 8403 12 8503 13 8603 14 8703 15 3404	237. VIATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54594 4.32642 8.12324 5.90198 4.413827 4.78437 8.19375 7.82595 4.23034 4.566330	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4.97777 6.07116 4.48343 2.66175 4.69190 6.86871 4.20783	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.76866 7.93699 4.18401 3.47976 6.15974 6.349-0 3.80194	SUMFALO 2.32353 4.26485 4.10985 2.48033 4.52090 8.06277 5.50310 3.931827 8.91885 7.80852 3.95239	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.670.65 10.08509 5.28780 5.47828 5.57129 8.24944 7.20050 3.71709	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 50883 4. 06664 5. 49157 19. 62152 8. 63024 4. 75959	ALL G 3.9164 6.1092 6.4188 3.6582 4.377. 6.157? 6.4937 4.2838 8.6682 7.9291 4.3615 4.3449
STANDAPO DE GROUP =	237. VIATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54594 4.32642 8.12324 5.90198 4.41362 4.78437 8.19375 7.82595 4.23034 4.56630 8.23483	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4.97777 6.07116 4.48343 2.66175 4.69190 6.6871 4.20783 3.32415 6.93013	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.76846 7.97699 4.18401 3.47976 6.15974 6.35974 6.35974 7.18150	SUMFALO 2.32353 4.26485 4.10985 2.48033 4.52090 8.06277 5.50310 3.93162 5.91387 8.91805 7.80862 3.95239 4.84834 8.48161	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67065 10.08509 5.24780 5.43728 5.57129 8.24944 7.20050 3.71709 3.73529 6.65117	GRA SORG 3. 41912 5. 40909 6. 18032 3. 69166 4. 55961 6. 50883 4. 06664 5. 49157 19. 62152 8. 63024 4. 75959 4. 43160	ALL G 3.9164 6.1092 6.4183 3.6582 4.3774 5.1577 6.4937 4.2364 4.6338 8.7682 7.9291 4.3616 4.3449 8.0285
STANDARD DE GROUP =	237. VIATIONS WINTWHIT 4.78255 7.37039 6.94452 3.54594 4.32642 8.12324 5.90198 4.413827 4.78437 8.19375 7.82595 4.23034 4.566330	GRASS 3.91058 6.26144 6.57121 3.72981 2.55569 4.97777 6.07116 4.48343 2.66175 4.69190 6.86871 4.20783 3.32415	CORN 3.49216 5.35003 6.67597 4.22024 4.15919 6.76866 7.93699 4.18401 3.47976 6.15974 6.349-0 3.80194 3.56519	SUMFALO 2.32353 4.26485 4.10985 2.48033 4.52090 8.06277 5.50310 3.93162 5.01387 8.91805 7.80852 3.95239 4.84834	NON AGR 2.39269 2.92138 3.82-23 2.75878 5.67075 10.08509 5.28780 5.43728 5.57129 8.24944 7.20050 3.717.09 3.73529	GRA SORG 3. 41912 5. 42909 6. 18032 3. 69166 4. 95961 6. 96883 4. 96664 5. 49157 19. 62152 8. 62152 4. 75959 4. 43160 8. 26803	ALL G 3.9164 6.1092 6.4168 3.6582 4.3774 5.1572 6.43374 4.8336 4.8336 4.8364 7.9291

VARIABLE	F TO FORCE	*	VAS	IISLE	_ 	FTT	FORCE	TOLEGANCE
	REMOVE LEVEL	*			Ε	MTER	LEVEL	
	F= 5 655	*			DF≈	5 65	4	
		¥	3	8401	1	4.823	1	1.000000
		¥	L _i	8501	1	5.649	1	1.000000
		*	5 .	96; 1	1	6.2+2	1	1.000000
		*	5	8751	1	5.632	1	1.000000
		*	7	8402		8.026	1	<u> </u>
		*	3	3522	1	0.424	1	1.000000
		¥		8602_	3	4.024	1	i, ევინიე
		*	10	B732	3	5.433	1	1.000000
		*	1 <u>1</u>	8 <u>423</u>	1	7 - 84 8	1	1.000000
		*	12	8503	2	5,659	1	1.000000
		¥	13	5603		9.220	11	1.000000
		~ *	14	6753	1	4.396	1	1.000000
		¥	15	3404_		4.636	. 1	<u>.</u> 1.060038
		+	16	3564	9	3.452	1	1.000660
		*	17	B604	1	5.551	<u> </u>	1.000000
		*	18	27C4	6	0.747	1	1.000000

12 8503	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCYÉTEVEL + ENTER LÉVÉL 4 BECL 7.769					16.89573	-13.65		-23.35		-21.74069	-18.59751
### DF= 5 649	### BEST F. F. F. F. F. F. F. F	18 8704		0.0156	1	-0.01277	G.5	2553	-0.0	3366	-0.10496	-0.02165
### REMOVE LEVEL # DF= 5.649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL	16_B5 <u>C4</u> _		0.9288	4				0.9	8428	0.93562	0.86729
REMCVÉ LEVEL * DFE 5 649 * DFE	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REHCVE LEVEL + BFE 5 649 * DFE 5 648. 4 8501 7.769 1 * 3 8-21 0.500 1 0.0037-7 6 8701 5.104 1 * 5 851 0.392 1 0.055701 10 8702 7.556 1 * 7 8402 2.346 1 0.7605703 12 8503 18,996 1 * 8 8502 2.973 1 0.722271 16 850- 33.399 1 * 9 8602 2.358 1 0.168666 18 8704 47.355 1 * 11 8403 1.991 1 0.77458 * 13 8603 2.201 1 0.47418 * 14 3703 2.869 1 6.619224 * 15 8464 0.916 1 0.99152 * 17 8504 1.298 1 0.99152 * 18 8501 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1											
REMCVÉ LEVEL * DF= 5 648	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL + ENTER LEVEL DF= 5 649 * OF= 5 648 1 0.0937.7 6 8701 7.769 1 * 3 8-01 0.548 1 0.0937.7 6 8701 5.104 1 * 5.861 0.332 1 0.065701 10 8702 7.556 1 * 7 8402 2.346 1 0.760518 12 8503 18.996 1 * 8 8502 2.973 1 0.760518 12 8503 18.996 1 * 9 8602 2.378 1 0.168666 18 8704 47.355 1 * 11.8403 2.201 1 0.476138 * 13 8603 2.201 1 0.476138 * 14 377.3 2.869 1 0.69181 0.090525 J-STATISTIC OR WILKS: LAMBOA 0.3115796 CEGREES OF FREEDOM 30.00 2598.08 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTHH GRASS CORN SUMFAL NON AG GRASS 4.62 COPM 139.32 19.39 SUMFAL 7.44 4.67 71.44 NON AG 1.59 1.83 14.08 0.41 GRASCP 22.04 4.45 121.72 5.85 1.11 CLASSIFICATION FUNCTIONS GROUP = MINTHHET GRASS CORN SUMFALO NON AGR GRASCASS 4 8501 -0.53299 -0.53287 -0.44333	10 8702				0.48882	_	3575				
REHCVÉ LEVEL * DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 3-01 0.500 1 0.0957-7 6 8701 5.104 1 * 5 3601 0.302 1 0.066701 10 8702 7.556 1 * 7 8402 2.346 1 0.760573 12 8503 18.096 1 * 8 8502 2.358 1 0.66666 18 8704 47.355 1 * 11 8403 1.991 1 0.579496 * 13 8603 2.211 0.476138 * 14 3703 2.869 1 0.476138 * 14 3703 2.869 1 0.619224 * 15 8404 0.918 1 0.991152 * 17 8504 1.298 1 0.99152 * 17 8504 1.298 1 0.992525 U-STATISTIC OR HILKS: LAMBDA 0.3115796 CEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTHH GRASS CORN SUMFAL NON AG GRASS 4.62 COPN 139.32 19.39 SUMFAL 7.44 4.67 71.44 NON AG 1.59 1.83 14.08 0.41 GRASCP 22.04 4.45 121.72 5.85 1.11 CCLASSIFICATION FUNCTIONS GROUP = MINIMHET GRASS CORN SUMFAL NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFAL NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFAL NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFAL NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFAL NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFALO NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFALO NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFALO NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFALO NON AGR GRASCRS GROUP = MINIMHET GRASS CORN SUMFALO NON AGR GRASCRS	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL + ENTER LEVEL DF = 5 649 * OF = 5 648.* 4 BEC1 7.769 1 * 3 8-21 0.508 1 0.0957-7 6 B701 5.104 1 * 5 351 0.332 1 0.055701 10 B702 7.556 1 * 7 8402 2.346 1 0.76653 12 B503 18.096 1 * 8 B502 2.358 1 0.168665 18 B504 33.399 1 * 9 B502 2.358 1 0.168665 18 B704 47.355 1 * 11 8402 1.991 1 0.579-98 13 B603 2.201 1 0.47238 14 3723 2.060 1 0.619224 15 8404 0.916 1 0.99152 17 B504 1.298 1 0.090525 JUSTATISTIC OR WILKS' LAMBDA 0.3115796 CEGREES OF FREEDOM 3 0.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTH GRASS CORN SUMFAL NON AG GRASS 4.62 COFM 139.32 19.29 SUMFAL 7.44 4.67 71.44 NON AG 1.59 1.83 1.408 0.41 GRASCP 22.94 4.45 121.72 5.85 1.11 CLASSIFICATION FUNCTIONS GROUP = MINTWHET GRASS COSN SUMFALO NON AGR GRASCP 22.94 4.45 121.72 5.85 1.11											
REHCVÉ LEVEL * DF= 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 BSC1 7.769 1 * 3 8-01 0.560 1 0.0937-7 6 B701 5.104 1 * 5 3611 0.560 1 0.0937-7 6 B701 5.104 1 * 7 8402 2.346 1 9.760518 10 B702 7.556 1 * 7 8402 2.346 1 9.760518 11 B702 7.556 1 * 7 8402 2.358 1 0.168665 12 B503 18,096 1 * 0 8502 2.358 1 0.168665 18 B704 47.355 1 * 11 8403 1.991 1 0.6794-96 18 B704 47.355 1 * 11 8403 2.201 1 0.476138 * 13 B603 2.201 1 0.476138 * 14 9703 2.669 1 0.659224 * 15 B404 0.918 1 0.091525 D-STATISTIC OR WILKS LAMBDA 0.3115796 CEGREES OF FREEDOM 6 5 654 DFPROXIMATE F-STATISTIC 29.311 DEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTWH GRASS CORN SUMFAL NON AG GRASS 4.02 COPN 139.32 19.29 SUMFAL 7.44 4.67 71.444 NON AG 1.59 1.83 14.08 0.41 GRASCP 22.04 4.45 121.72 5.85 1.11 CLASSIFICATION FUNCTIONS GROUP = WINTWHET GRASS COSN SUMFAL SUMFALO NON AGR GRASCR	4 85C1		0.4069	1	-0.51205	-0.29	9557	-0.5	3299	-0.53287	-0.44333
REMCVÉ LEVEL # DF= 5 648	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCUE LEVEL * ENTER LEVEL DF = 5 649 * DF = 5 648. 4 85C1 7.769 1 * 3 8-C1 0.560 1 0.0957-7 6 87D1 5.104 1 * 5 36C1 0.352 1 0.665701 10 8702 7.556 1 * 7 84C2 2.346 1 0.760538 12 85G3 18.096 1 * 6 85C2 2.953 1 0.768665 16 85D4 33.399 1 * 9 86D2 2.358 1 0.168665 16 85D4 33.399 1 * 11 84C3 1.991 1 0.679-96 18 87D4 47.355 1 * 11 84C3 1.991 1 0.772138 * 13 86C3 2.211 1 0.472138 * 14 37C3 2.860 1 0.619224 * 15 84C4 0.916 1 0.091525 J-STATISTIC OR WILKS: LAMSDA 0.3115796 DEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTHH GRASS CORN SUMFAL NON AG GRASS 4.62 COPN 139.32 19.39 SUMFAL 7.44 4.67 71.44 NON AG 1.59 1.83 14.08 0.41 GRASCF 22.94 4.45 121.72 5.85 1.11											
### REHCVE LEVEL ### DF= 5 648 ## DF= 5 648 ### DF= 5 648	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648. 4 8501 7.769 1 * 3 8-51 0.560 1 0.0937-7 6 8701 5.104 1 * 5 3651 0.392 1 0.065701 10 8702 7.558 1 * 7 8402 2.346 1 0.760578 12 8503 18,096 1 * 6 8502 2.953 1 0.722221 16 850+ 33,399 1 * 9 8602 2.358 1 0.168666 18 8704 47,355 1 * 11,6403 1.991 1 0.476138 * 13 8603 2.201 1 0.476138 * 14 9703 2.860 1 0.619224 * 15 8404 0.916 1 0.090525 J-STATISHIC OR WILKS' LAMBDA 0.3115796 CEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 WINTHH GRASS CORN SUMFAL NON AG GRASS 4.52 COFM 139,32 19.29 SUMFAL 7.44 4.67 71.44 NON 46 1.59 1.83 14.08 0.41 GRASS 22.04 4.45 121.72 5.85 1.11	G <u>F</u>	₹00P =	HWIMIW HWIMIW	ΞΪ	GRASS	0.051	₹	S:J#I	FALO	NOM AGR	694 S083
### REHCVE LEVEL ### DF= 5 648 ### SF= 5 649 ### SF= 5 648 ### SF= 5 649 ### SF= 5 648 ### SF= 5 649 ### SF= 5 648	VARIABLE	LASSIFICA	ATION_FUN	CTIONS	- ·····			s. 7-16-s. lesi				
### REMCYE LEVEL ### DF= 5 648 ## OF= 5 648 ### OF= 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCUÉ LEVEL * DF= 5 649 * OF= 5 648. 4 8EC1 7.769 1 * 3 8-E1 0.500 1 0.093747 6 8701 5.104 1 * 5 8611 0.392 1 0.066701 10 8702 7.552 1 * 7 8402 2.346 1 0.760530 12 8503 18,096 1 * 8 8502 2.993 1 0.760530 12 8503 18,096 1 * 8 8502 2.338 1 0.165666 18 8704 47.355 1 * 11 8403 1.991 1 0.079496 * 13 8613 2.201 1 0.476138 * 14 9703 2.969 1 0.619224 * 15 8404 0.918 1 0.931152	GRASC#	c,c + <u>9.9.</u> tt _	9.•	42	<u> </u>	2.07	<u></u>	<u></u>			
### REMCVÉ LEVEL ### DF= 5 648 ### DF= 5 649 ### DF= 5 648 ### B5C1	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8-01 0.560 1 0.0937-7 6 8701 5.104 1 * 5.361 0.392 1 0.565701 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8.8502 2.953 1 0.165666 18 8704 33.399 1 * 9 8602 2.358 1 0.165666 18 8704 47.355 1 * 11.8403 1.991 1 0.476138 * 13 8603 2.201 1 0.476138 * 14 9703 2.669 1 0.619224 * 15 8404 0.918 1 0.091525 J-STATISTIC OR WILKS' LAMBOA 0.3115796 CTGREES OF FREEDOM 30.00 2598.08 F - MATRIX DEGREES OF FREEDOM = 6 649 MINITHH GRASS CORN SUMFAL NON AG GRASS 4.62 19.39 SUMFAL 7.44 4.67 71.444							41.44				
### BETTER LEVEL ### DF= 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REHCVE LEVEL * ENTER LEVEL DF= 5 649 * OF= 5 648. 4 85C1 7.769 1 * 3 8-C1 0.560 1 0.0937-7 6 87D1 5.104 1 * 5 861 0.392 1 0.665701 10 87D2 7.556 1 * 7 8402 2.346 1 9.760518 12 8503 18,096 1 * 8 85C2 2.973 1 0.72221 16 850+ 33.399 1 * 9 8602 2.338 1 0.165666 18 87D4 47.355 1 * 11 8403 1.991 1 0.679496 * 13 86C3 2.201 1 0.476138 * 14 37C3 2.660 1 0.619224 * 15 8404 0.918 1 0.090525 J-STATISTIC OR HILKS* LAMBDA 0.3115796 CEGREES OF FREEDOM 30.00 2598.00 J-STATISTIC OR HILKS* LAMBDA 0.3115796 CEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 MINITAR GRASS CORN SUMFAL NON AG GRASS 4.02 COFN 139.32 19.29						0.44				 	
REHCVÉ LEVEL + DF= 5 648 D	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8-01 0.560 1 0.0957-7 6 8701 5.104 1 * 5 3601 0.392 1 0.065701 10 8702 7.558 1 * 7 8402 2.346 1 9.760578 12 8503 18.096 1 * 8 8502 2.953 1 0.760578 16 8504 33.399 1 * 9 8602 2.338 1 0.165666 18 8704 47.355 1 * 11 8403 1.991 1 0.679498 * 13 8603 2.201 1 0.476138 * 14 3703 2.660 1 0.619224 * 15 8404 0.918 1 0.090525 J-STATISTIC OR HILKS: LAMBDA 0.3115796 DEGREES OF FREEDOM & 5 654 AFPROXIMATE F-STATISTIC 29.311 DEGREES OF FREEDOM 30.00 2598.00 F - MATRIX DEGREES OF FREEDOM = 6 649 MINITHH GRASS CORN SUMFAL NON AG GRASS 4.02					71 1. 1. 1.						
REHCVE LEVEL	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * OF= 5 648. 4 8501 7.769 1 * 3 8-01 0.500 1 0.0957-7 6 8701 5.184 1 * 5 3601 0.392 1 0.066781 10 8702 7.556 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8 8502 2.358 1 0.165666 16 8504 33.399 1 * 9 8602 2.358 1 0.165666 18 8704 47.355 1 * 11 8403 1.991 1 0.679496 * 13 8603 2.201 1 0.478138 * 14 3703 2.669 1 0.619224 * 15 8404 0.918 1 0.991525 J-STATISTIC OR WILKS LAMBDA 0.3115796 CEGREES OF FREEDOM 30.00 2598.00 #F - MATRIX DEGREES OF FREEDOM = 6 649 WINTWH GRASS CORN SUMFAL NON AG					T 1978						
REMCVE LEVEL	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 648 4 85C1 7.769 1 * 3 8-C1 0.568 1 0.0957-7 6 87C1 5.104 1 * 5 35C1 0.392 1 0.055781 10 87D2 7.558 1 * 7 84C2 2.346 1 0.766538 12 85G3 18.096 1 * 8 85E2 2.973 1 0.722221 16 85D4 33.399 1 * 9 86C2 2.378 1 0.168666 18 87C4 47.355 1 * 11 84C3 1.991 1 0.679496 * 13 86C3 2.201 1 0.478138 * 14 37C3 2.669 1 0.619224 * 15 84C4 0.918 1 0.991152 * 17 86C4 1.298 1 0.090525 J-STATISTIC OR HILKS' LAMBDA 0.3115796 CEGREES OF FREEDOM 5 5 654 AFPROXIMATO F-STATISTIC 29.311 DEGREES OF FREEDOM 30.00 2598.00				RASS	CORN	SUMFAL	NON	AG			
REMCVE LEVEL	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REHCVE LEVEL + ENTER LEVEL DF= 5 649 * DF= 5 648* 4 8501 7.769 1 * 3 8-01 0.500 1 0.0937-7 6 8701 5.104 1 * 5 3501 0.392 1 0.065701 10 8702 7.558 1 * 7 8402 2.346 1 9.760538 12 8503 18.096 1 * 8 8502 2.973 1 0.722271 16 8504 33.399 1 * 9 8602 2.378 1 0.168666 18 8704 47.355 1 * 11 8403 1.991 1 0.679496 * 13 8603 2.231 1 0.478138 * 14 3703 2.069 1 0.619224 * 15 8404 0.918 1 0.991152 * 17 8504 1.298 1 0.090525 D-STATISTIC OR WILKS* LAMBOA 0.3115796 CEGREES OF FREEDOM 8 5 654 EFPROXIMATO F-STATISTIC 29.311 DEGREES OF FREEDOM 30.00 2598.00	F - MATRI	(X	DEGRE	ES OF	FREEDOM =	6 6!	-9				
REMCVS LEVEL # DF= 5 648 4 85C1 7.769 1 # 3 8+C1 0.568 1 0.095747 6 87C1 5.104 1 # 5 36C1 0.392 1 0.066781 10 87D2 7.558 1 # 7 84C2 2.346 1 0.760538 12 85G3 18.096 1 # 8 85C2 2.953 1 0.722221 16 85D4 33.399 1 # 9 86C2 2.358 1 0.165666 18 87D4 47.355 1 # 11 84C3 1.991 1 0.079498 # 13 86C3 2.201 1 0.478138 # 14 37C3 2.060 1 0.619224 # 15 84C4 0.918 1 0.091525 # 17 86C4 1.298 1 0.090525	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648. 4 85C1 7.769 1 * 3 8-C1 0.560 1 0.0937-7 6 87C1 5.104 1 * 5 85C1 0.392 1 0.665781 10 8702 7.558 1 * 7 84C2 2.346 1 0.760538 12 8503 18.096 1 * 8 85C2 2.953 1 0.722221 16 8504 33.399 1 * 9 86C2 2.358 1 0.168665 18 87C4 47.355 1 * 11 84C3 1.991 1 0.679496 * 13 86C3 2.201 1 0.478138 * 14 37C3 2.660 1 0.519224 * 15 84C4 0.918 1 0.090525 * 17 86C4 1.298 1 0.090525			12110		29.31	.1 95(REES	UF FREET	MUL	38.00 259	8-09
REMCVE LEVEL # DF= 5 648 * DF=	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF = 5 649 * DF = 5 648. 4 8501 7.769 1 * 3 8-01 0.560 1 0.0957-7 6 8701 5.104 1 * 5 3601 0.392 1 0.066701 10 8702 7.556 1 * 7 8402 2.346 1 0.760518 12 8503 18.096 1 * 8 8502 2.358 1 0.165666 18 8704 47.355 1 * 11 8403 1.991 1 0.679496 * 13 8603 2.201 1 0.478438 * 14 3703 2.060 1 0.690525 * 15 8404 0.918 1 0.39152 * 17 8604 1.298 1 0.090525	-214112 <u>[</u>]	LO UK WIL	KST LA	un DA							
REMOVE LEVEL # ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REHCVS LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8401 0.568 1 0.695747 6 8701 5.104 1 * 5 3601 0.392 1 0.665781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 88502 2.953 1 0.722201 16 8504 33.399 1 * 9 8602 2.358 1 0.168666 18 8704 47.355 1 * 11 8403 1.991 1 0.679498 * 13 8603 2.201 0.478438 1 0.478438 * 14 3703 2.660 1 0.599152					A						
REMCVE LEVEL # ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVS LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8+01 0.560 1 0.093747 6 8701 5.104 1 * 5 3601 0.392 1 0.066781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8 8502 2.993 1 0.722221 16 8504 33.399 1 * 9 8602 2.358 1 0.165666 18 8704 47.355 1 * 1 8603 2.201 1 0.478138 * 14 3703 2.669 1 0.619224 * 15 8404 0.918 1 0.991152					**	17 E604		1.298	<u> </u>	0.09052	5
REMCVE LEVEL # ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8+01 0.568 1 0.095747 6 8701 5.104 1 * 5 3601 0.392 1 0.065781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 88502 2.953 1 0.722221 16 8504 33.399 1 * 98602 2.358 1 0.168666 18 8704 47.355 1 * 11 8403 1.991 1 0.679496 * 13 8503 2.201 1 0.478138 * 14 3703 2.669 1 0.619224					-		•	C.918		0.99115	2
REMCVE LEVEL + ENTER LEVEL DF= 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8-01 0.568 1 0.0957-7 6 8701 5.104 1 * 5 861 0.392 1 0.065781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8 8502 2.953 1 0.722201 16 8504 33.399 1 * 9 8602 2.358 1 0.165666 18 8704 47.355 1 * 11 8403 1.991 1 0.679496						14 3703		2.060	1_	0.51922	4
REMCVE LEVEL + ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8+01 0.568 1 0.0957+7 6 8701 5.104 1 * 5 851 0.392 1 0.066781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8 8502 2.953 1 0.168666 16 850+ 33.399 1 * 9 8602 2.338 1 0.168666						13 8663				0.47813	8
REMOVE LEVEL + ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8-01 0.568 1 0.095747 6 8701 5.104 1 * 5 801 0.392 1 0.066781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538 12 8503 18.096 1 * 8 8502 2.953 1 0.722201	18 8704	4	7.355	1	*						
REMCVE LEVEL + ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMCVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648 4 8501 7.769 1 * 3 8401 0.568 1 0.095747 6 8701 5.104 1 * 5 8601 0.392 1 0.065781 10 8702 7.558 1 * 7 8402 2.346 1 0.760538				1	*						
REMOVE LEVEL # ENTER LEVEL DF = 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648. 4 8501 7.769 1 * 3 8401 0.588 1 0.095747 6 8701 5.104 1 * 5 3601 0.392 1 0.066781	12 8503	. 1	8.096	_	*				_		-
REMOVE LEVEL + ENTER LEVEL DF= 5 649	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648. 4 8501 7.769 1 * 3 8401 0.568 1 0.095747					*						
REMOVE LEVEL + ENTER LEVEL DF= 5 649 + DF= 5 648	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL DF= 5 649 * DF= 5 648					¥						
REMOVE LEVEL + ENTER LEVEL	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE REMOVE LEVEL * ENTER LEVEL	4 8501				*					0.09574	
	VARIABLE F TO FORCE * VARIABLE F TO FORCE TOLERANCE			-		¥		DF=				
VARIABLE FIO FORCE * VARIABLE FIO FORCE TOLERANCE							1.2.2.4.02.eF					<u></u>
	ARTHORE ENTERED O ENDI			FID	EUBCE	' *	VADTABLE		E TO	E001E	TOTESANT	在

	PERCENT CORYLCT	NUMBER	OF CASES	CLASSIFI	ED INTO GRO	UP -	
		WINTWHE	T GRASS	COSN	SUMFALO	NON AGR	GRASOPG
PINTHHET	39.7	94	29	11	40	31	32
GPASS	43.8	2	7	2	3	1	1
C03H	77.3	2	14	92	4	3	Lą.
SUMFALO	40.4	5	3	1	21	8	14
FDA NO4	57.1	<u> </u>	0	0	2	4	1
GRASORG	44.5	27	36	2	32	30	102
TOTAL	48.5	130	89	108	102	77	154
JACKKHIFE	D CLASSIF	ICATION					
	PERCENT COPRECT	NUMBER	OF CASES	CLASSIFI	ED INTO GRO	UP -	
	PERCENT COPRECT		OF CASES		ED INTO GRO		GRASO9G
	COPRECT				·		GRAS09G `33
	COPREC <u>T</u>	WINTWHE	T GRASS	СОЯИ	SUMFALO	NCN AGR	
NINTWHET	COPREC <u>T</u>	WINTWHE 93	7 68488 29	CORN 11	SUHFALO 40	NCN AGR	
NINTWHET		WINTWHE 93	7 GRASS 29 5	CORN 11 2	SUMFALO 40	NCN AGR 31 2	
ETNTRHET GRASS CORN	GOPRECT 39.2 31.3 76.3 34.5	WINTWHE 93	T GRASS 29 5 15	CORN 11 2	SUMFALO 40 4	NCN AGR 31 2 3	`33 1 4
KINTWHET GRASS CORN SUMFALO	39.2 31.3 76.3 34.5 14.3	WINTWHE 93	T GRASS 29 5 15	CORN 11 2	SUMFALO 40 4 4 20	NCN AGR 31 2 3	`33 1 4
KINTWHET GRASS ORN SUMFALO MOM AGP	39.2 31.3 76.3 34.5 14.3	WINTWHE 93 2 2 2 6	7 GRASS 29 7 15 3	CORN 11 2 91 1	SUMFALO 40 4 4 20 3	NCN AGR 31 2 3 8	`33 1 4 14 1

STEP	 VARI	ABLE	F VALUE TO	NUMBER OF	U-STATISTIC	APPROXIMATE
NUMBER	ENTERED	REMO VEO	ENTER OR REMOVE	VARIABLE'S INCLUDED		<u>F-STATISTIC</u>
1	 2504		93.4517	ſ	0.5833	93.452
2	 B7C4		48.5812	5	C. 4251	69.730
····~	 3503		21.3347	3	0.3654	52.825
L	 8501		8.3584	•	G.3433	41.381
	 B702		7.8222	- 3	Q. 3238	34.273
5	 8701		5.1035	5	0.3116	29.311

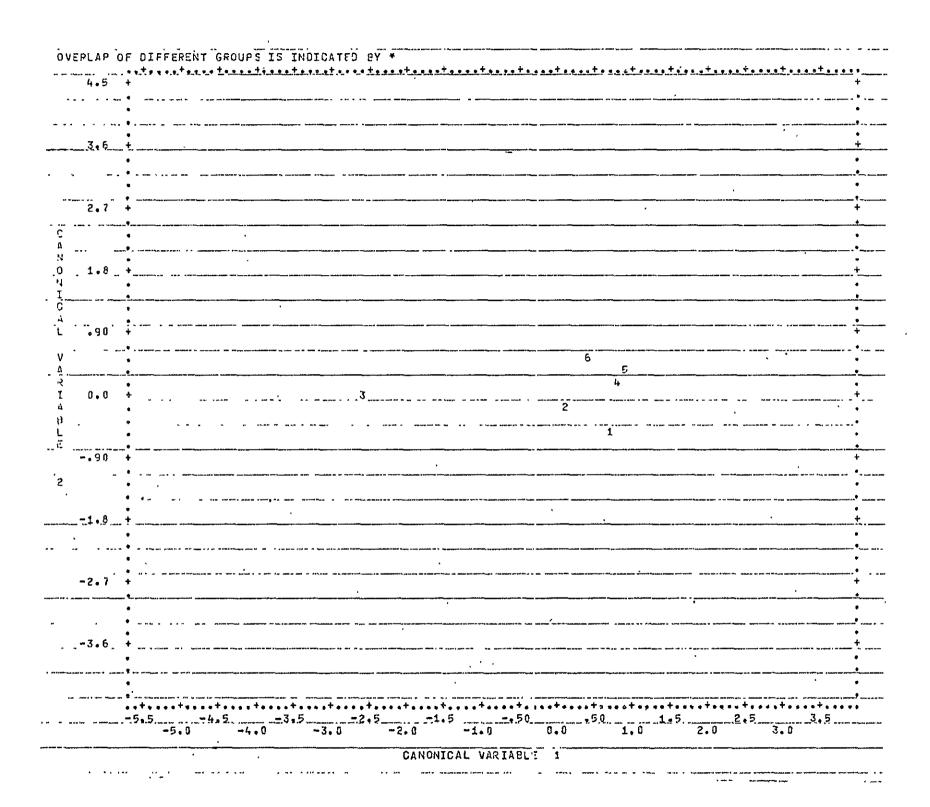
Percent of Variation Between Groups Explained

Eigenvalues	1.48721	0.20053	0.04240	0.02807	0.00297
Percentage	84.44	11.39	2.41	1.59	0.17
-					
Canonical Correl	at i ons				
	0.77327	0.40870	0.20169	0.16524	0.05438

4 8501	-0:04524	-0.04940	0.11836	-0.09478	-0.03511
6 B701	0.05794	-0.06724	0.05951	0.19177	0.21326
10 67[2	0.07292	0.03212	0.09480	0.10353	-0.20090
12 BF03	0.02450	0.08266	0.04919	-0.36724	-0.90535
16 8504	0.08181	-0.93433_	0.09049	0.06272	0.14793
19 8764	-6.16714	-0.06639	-0.03225	-0.10012	0.03198
CNSTANT	-3.09894	1.30023	3.42790	2.37535	-1.815-5
FOUP	CANONICAL VAR	TABLES EVALU	ATED AT GROU	P MEANS	
WINTWHET	0.65676		0.05567	0.03942	0.00232_
	0.07913				
CORN	-2.56989_	-0.05783	-0.03201	-0.02416	-0.00271
	0.81931				
	0.92261				
GRASORG	0.43597	0.52409	0.12354	-0.01119	0.08364

GROUP	Mean Coordir	nates	Symbol for Cases	Symbol for Mean
Winter wheat	0.66	-0.52	Α	1 .
Grass	0.08	- 0.20	В	2
Corn	-2.57	-0.06	· C	3
Summer Fallow	0.82	0.21	D	4
Non-agriculture	0.92	0.33	E	5
Grain sorghum	0.44	0.52	F	6

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4.5 +	
•	Hays require an intelligence of the state of
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3.6 +	
•	
	F
2.7 +	F ₽ ·
	· F
•	FFF F F
	FFF AAAD* FF
_ 1 . 8 +	
<u>.</u>	C F F FF FD + FFFF FAF A
•	C A * FF F FF* F A C C F F *FFFFF0 * **FFF*A DF A
.9g + "	F AF F FFF F*F*FFACSF*AF O AO
	C C A A F FC*F F*FF* *GF**^A *A A
•	C C CCC C CA C F FAF 6**ADA**FAA* * C C C C C A F B C * 4**F*AAFAF**5 AF BA
•	CCCCCCC * C A C * C A * * F* 4**** F F
0.0 +	C _ CGC CG
•	C C C C C C C C C C
•	C CC C B A F *1* A**F*AAFA
90 +	C C C C C C A C C B C A****FA*A**A C F B A A* 4A BA*** * A A
•	C C F C + + + + A A A A
•	C C F F C* * * *A*
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	$-5 \cdot -4 \cdot 5 -3 \cdot 5 -2 \cdot 5 -1 \cdot 5 -5 \cdot 0 \cdot 0 \cdot 0 \cdot 1 \cdot 5 -2 \cdot 5 -5 \cdot 0 -1 \cdot 0 \cdot $



APPENDIX BB3

Discriminant Analysis of RICE County with ERTS Bands Ratioed Within a Date --

$$R_{i} = \frac{x_{i}}{\sum_{j=1}^{4} x_{j}}$$

Transformation of Original Variables

1	SUPPOUTINE TRANSFIX, KASE, MEROG, USE
5	COMMON/GETCHA/PAD(17),XMIS
3	DIMENSIC' X(1)
<u>3</u>	$81 = \chi(3) + \chi(4) + \chi(5) + \chi(6)$
5	R2 = X(7) + X(8) + X(9) + X(10)
6	$\dot{c}3 = \chi(1:) + \chi(12) + \chi(13) + \chi(14)$
7	R4 = X(15) + X(16) + X(17) + X(18)
8	$\chi(3). = \chi(3)/31$
9	X(4) = X(4)/31
10	X(5) = X(5)/31
11	$X(a) = \lambda(f)/3t$
12	x(7) = x(7)/32
13	X(R) = X(r)/3r
14	x(9) = x(9)/92
15	X(10) = X(10)/82
16	X(11) = Y(11)/33
17	X(12) = Y(12)/33
18	$\chi(13) = \chi(13)/83$
19	X(14) = Y(14)/33
5.0	$\chi(15) = \chi(15)/34$
21	X(16) = X(15)/34
22	X(17) = X(15)/34
23	X(18) = X(16)/34
24	RETURN
25	end .

BMPP7M - STEPWISE DISCRIMINANT ANALYSIS,
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
IN THIS VERSION OF PMDP74
GROUP CODES OR CUTPOINTS HUST BE STATED.
PROGRAM CONTROL INFORMATION
PROPLEM TITLE = TRICE CO SAMP, 1, RATIO DATA!,/
IAPUT -
VAPIABLE = 20.
FORMAT = 1(2A5,12F5.0/6F5.0)1.
CASÉ = 66g.
$0_{\rm M}T = 12.7$
VARIAS ADD = 1.
NAME = 'ROM', CCCUMN', 'B4D1', 'B5D1', 'B6D1', 'R7D1', 'B4D2',
185021,185021,187021,184031,185031,186031,187031,184041,185041,
'B6D4', 'B7D4', 'CROP TYP', 'SOIL TYP', 'CROP#SOL',
LSE = $3.4.5.6.7.8.9.10.11.12.13.14.15.16.17.18.20.$
l, At FL = 1,2,
GPOUP = 1CROP TYP1,/
THALSFORMATION
$\chi(21) = \chi(19) * \chi(20)./$
GROUP CODE = 1,2,3,4,5,8.
MAYE = 'WINTHHET', 'GRASS', 'CORN', 'SUMFALO',
'NON AGR', 'GRASORG', /
PRINT STEP,
CLASS = 1.7,3,4,5,6,7,8,9,10,11,12,13,14,15,/
PLOT CANON. GROUP = 1,2,3,4,5,8.
GILOUP = 1,2,3,4,8,/
DISCRIPTION = 2.
FORCE = U.
STEP = 40.
JACK:/
EVUX
PROBLEM TITLE , RICE CO SAMP, 1, RATIO DATA
and a second sec
NUMBER OF VARIABLES TO READ IN 20
MUMBER OF VARIABLES ADDED BY TRANSFORMATIONS, . 1
TOTAL NUMPER OF VARIABLES 21
TUMBER OF CASES TO FEAD IN 660
CASE LABELING VAPIABLES :
LIMITS AND MISSIMS VALUE CHECKED REFORE TRANSFORMATIONS
INPUT UNIT NUMBER
PEWIND INPUT UNIT PRIOR TO READING, . DATA, . YES
INPUT FORMAT
(245,12F5.0/6F5.0)
TO AL DUDGATUE ADMICEOUNTAINE 100
TRIERPRETIVE TRANSFORMATIONS ARE
CRCP#SOL = CROP TYP # SOIL TYP.

	3 B4D1	4 #	501		· 5	86D1	•	6	6701	?	54D2
·	л ₆ 502		602		10	5722			8403	13	2503
	13 8603		703			84D4			B504	17	8604
	18 R7D4			Ţ,YP							
TCLERANCE	, , , , , , , ,	0,010									
F-10-E"TER .	<u>, , , , , , , , , , , , , , , , , , , </u>	4.000									
F-TO-REMOVE,		3,996		•							
METHOD :	, <u>, , , , , , , , , , , , , , , , , , </u>	2	·								
MAKIMUM FORCE	D LEVEL	(ì				_				
MAYIMUM NUHRE	R OF STEPS.	40									
PRICE PROBLET	ITIES	0.15667		0.15667	0,	16667	0,1568	7	0.16667	0:1666	57
	BEFORE	TRANSFORM	IAT	ON					INT:	ERVAL RA	
YADIARLE	MUMINIM	MUMIXAM		MISSING		ATEGOR'		108Y	GREAT	<u>₹</u>	ESS THAN
NO. NAME	ŢĬĦŢŢ	LIMIT		CODE	Ċ	0 <u>D</u> E	NAME		THAN		R EQUAL TO
19 CHOP TY	 ပု					1,0000			7		
				<u> </u>		2,0000	<u>0 GRAS</u>	<u>ss</u>			
					,	3.0000	CORN	1			
						4,0000					
						5.0000	O NON	4 GR			
					-	8,0000	O GRAS	ORG			

GROUP #	WINTWHEY	GRASS	ÇORN	SUMFALO	NOW AGR	GRASORG	ALL GP
ARTAULE 3 8401	0,27441	0.27279	0,29630	0.28365	0.29654	0.28221	0128193
	0.25933	0.23533	0,26277	0,244.76		0,24647	
4 P501 5 B601	0.30878	n.32201		0,311.15	0,25025	0,31146	0,25368 0,30798
8 8701	0,15747	0.16987	0,29681 0,14412	0,16034	0,30188 0,15733	0,15986	
7 8472		0.24936		0,249.6		0,25123	0,15642
6 67US	0,24027	0.24965	0,26615	0,24949	0.23342	0,26285	0,24959
9 B6D2	0,23286 0,34275	0.32575	0,27787 0,33310	0,33688	0,232 <u>27</u> 0,34734	0,28241	0,25310
	0.18412	0.17525	0,15288	0,17106	0,18637	0.16351	0,32720
10 8702 11 8403		0.26066		0,27237	0.26934	C,26548	0,17012
12 R5n3	0,26968 0,26479	n.2353n	0,25698	0,27396	0.26880	0.27513	0,26483 0,26057
13 B6D3	0,31494	0,33584	<u>0,27122</u>	0,30818	0.31440	<u>6</u> ;3 <u>1</u> 182	0,31982
14 8/P3	0,31494	0.16519	0,34788 0,18012	0,145.9	0,31440	0,14758	0:15478
14 15/113 15 R4D4	0,15000	0,25624	0.22003	0,1451.9	0,25862	0,25742	0,24964
LA 8504	0.27873	0,25568	0,22003	0,27994	0,28364	0,26378	0,25504
17 B604	0.00181	0,00188	0,00130	0,001117	0,00198	0,00169	0,00175
LA 8704	0.00181	0.00186	0,00130	0,00107	0,00178	0,00189	0,00175
76 - 90 L TYP	2,43638	2,31250	2,51201	2,46154	2,42557	2,29258	2,39697
TO CROP TYP	1,00000			•			
	1 . [(1111 [[11	2.00000	3,00000	4,00000	<u> </u>	<u> </u>	4109242
1.4 AV.II. T.) I							
,	237.	16.	119,	52,	7.t		660;
,	237,	16.	119,	52,	7.		660;
STANDARD DE	237,	16. GRASS	119,	52. Sumfali	NON AGR	, 925 	660; ALL GP
STANDARD DE GROUP =	237. VIATIONS VINTURET	GRASS	CORN	SUMFAL()	NON AGR	DHOPARD	ALL GP
STANDARD DE GROUP = ADJARLE 3 8401	237. VIATIONS VINTURET 0.02409	GRASS 0.02695	CORN 0:03413	SUMFAL() 0+02433	NON ASR 0.01879	0902A30 SS(50+2	ALL 6P
STANDARD DE GROUP = ADJARLE 3 8471 4 9591	237. VIATIONS VINTURET 0.02409 0.03130	GRASS 0.02695 0.04237	CORN 0:03413 0:03460	SUMFALO 0.02433 0.03396	NON AGR 0.01879 0.03479	GRASORG 	ALL 6P
STANDARD DE STANDARD DE GROUP = ADJARLE 3 8401 4 0501 5 6601	237, VIATIONS VINTUMET 0.02409 0.03130 0.02418	GRASS 0.02695 0.04237 0.03623	CORN 0:03413 0:03460 0:03203	SUMFALO 0+02433 0+03396 0+02790	NON AGR 0.01879 0.03479 0.03479		ALL GP 0102835 0103405 0102843
STANDARD DE STANDARD DE GROUP = ADJARLE 3 8471 4 0501 5 8601 6 8701	237, VIATIONS VINTUMET 0.02409 0.03130 0.02418 0.02266	GRASS 0.02695 0.04237 0.03623 0.03234	CORN 0:03413 0:03413 0:03460 0:03201 0:03682	SUMFAL() 0.02433 0.03396 0.02790 0.02391	NON AGR 0.01879 0.03479 0.03090 0.02090	GRASORG 25,030,22 25,037,83 20,031,25 20,031,25	ALL 6P 0:02835 0:03405 0:02843 0:02843
STANDARD DE GROUP = ADJABLE 3 84P1 4 95P1 5 86P1 6 87P1 7 84D2	237, VIATIONS VINTUMET 0.02409 0.03130 0.02418 0.02266 0.02123	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091	CORN 0:03413 0:03460 0:03201 0:03682 0:01694	SUMFALO 0.02433 0.03396 0.02790 0.02790 0.02391 0.02028	NON AGR 0.01879 0.03479 0.02090 0.02392 0.02353	GRASORG C.03022 C.03583 C.03583 C.02566 C.02956	ALL GP 0:02835 0:03405 0:02843 0:02712 0:02051
STANDARD DE GROUP = ADJARLE 3 84P1 4 95P1 5 86P1 6 87P1 7 84P2 9 85P2	237, VIATIONS VINTUMET 0.02409 0.03130 0.02416 0.02266 0.02123 0.04402	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520	CORN 0:03413 0:03460 0:03201 0:03682 0:01694 0:0220	SUMFALO 0.02433 0.03396 0.02790 0.02790 0.02028 0.02028	NON AGR 0.01879 0.03479 0.02090 0.02392 0.02353 0.05324	GRASORG 	ALL 6P 0:02405 0:02405 0:02843 0:02712 0:02051
STANDARD DE GROUP = GROUP = A N5N1 A N5N1 5 R6N1 6 R7N1 7 R4N2 A N5N2 9 R6N2	237, VIATIONS VINTUHET 0.02409 0.03130 0.02416 0.02466 0.02123 0.04402 0.03309	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520 0.02837	CORN 0:03413 0:03460 0:03201 0:03682 0:01694 0:0220 0:02048	SUMFALO 0.02433 0.03396 0.02790 0.02790 0.02391 0.02028 0.04149 0.03272	NON AGR 0.01879 0.03479 0.02090 0.02392 0.02353 0.05324 0.05467	GRASORG C.03022 C.03583 C.03583 C.03585 C.02756 C.02762 C.02762 C.02789	ALL 6P 0:02835 0:02405 0:02843 0:02712 0:02051 0:03838 0:02924
STANDARD DE GROUP = ADJABLE 3 84P1 4 95P1 5 86P1 7 84P2 A 95P2 9 86P2 10 87P2	237, VIATIONS VINTUMET 0.02409 0.03130 0.02416 0.02416 0.02123 0.04402 0.03309 0.03063	GRASS 0.02695 0.04237 0.03623 0.03623 0.02091 0.03520 0.02837	CORN 0:03413 0:03460 0:03201 0:03682 0:01694 0:01220 0:02148 0:01594	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04149 0:03272 0:02734	NON AGR 0.01879 0.03479 0.02090 0.02392 0.02353 0.05324 0.05467	GRASORG C.03022 C.03583 C.03585 C.02566 C.02746 C.02789 C.02767	ALL GP 0102835 0102405 0102843 0102712 0102051 0103838 0102924
STANDARD DE GROUP = ADJABLE 3 84P1 4 05P1 5 86P1 7 84P2 9 86P2 19 87D2 11 84D3	237, VIATIONS VINTUHET 0.02409 0.03130 0.02416 0.02416 0.02123 0.04402 0.03309 0.03063 0.01985	GRASS 0.02695 0.04237 0.03623 0.03734 0.02791 0.02837 0.02837	CORN 0:03413 0:03446 0:03460 0:07201 0:07682 0:01694 0:07220 0:02048 0:01594 0:01991	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04189 0:03272 0:02734 0:01873	NON AGR 0.01879 0.03479 0.02392 0.02353 0.05324 0.05324 0.05467 0.04221 0.01122	GRASORG	ALL GP 0:02835 0:02405 0:02843 0:02712 0:02051 0:03838 0:02924 0:02653
STANDARD DE GROUP = GROUP = ADJARLE 3 R4P1 A R5P1 5 R6D1 6 R7P1 7 R4D2 9 R6D2 9 R6D2 10 R7D2 11 P4D3 12 R5D3	237, VIATIONS VINTURET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03309 0.03063 0.01985 0.02917	GRASS 0.02695 0.04237 0.03623 0.03234 0.02991 0.03520 0.02837 0.02540 0:02524 0:03980	CORN 0:03413 0:03460 0:03201 0:0362 0:01694 0:0220 0:02048 0:01594 0:01991 0:03300	SUMFAL() 0:02433 0:03396 0:02790 0:02791 0:02028 0:04149 0:032/2 0:02734 0:018/3	NON AGR 0.01879 0.03479 0.02392 0.02353 0.05324 0.05324 0.05467 0.04221 0.01122 0.01730	GRASORG	ALL GP 0:02835 0:028405 0:02843 0:02051 0:03838 0:02924 0:02653 0:02822
STANDARD DE GROUP = ADJABLE 3 84P1 4 05P1 5 86P1 7 84D2 0 85D2 9 86D2 10 87D2 11 84D3 12 85D3 13 86D3	237. VIATIONS VINTURET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03309 0.03309 0.03309 0.01985 0.02917 0.02370	GRASS 0.02695 0.04237 0.03623 0.03234 0.032520 0.02837 0.02540 0.02524 0.03980 0.03705	CORN 0:03413 0:03460 0:03201 0:0362 0:01694 0:01594 0:01991 0:03300 0:02741	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04149 0:03272 0:02734 0:01633	NON AGR 0.01879 0.03479 0.02392 0.02353 0.05324 0.05324 0.05467 0.04221 0.01122 0.01730 0.01277	GRASORG	ALL GP 0:02835 0:03405 0:02843 0:02712 0:02838 0:02924 0:02828 0:02757
STANDARD DE GROUP = ADJABLE 3 84P1 4 05P1 5 86P1 7 84P2 9 86P2 10 87P2 11 84P3 12 85P3 13 86P3	237. VIATIONS VINTUMET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03309 0.03309 0.0363 0.01985 0.02917 0.02370 0.01513	GRASS 0.02695 0.04237 0.03623 0.03234 0.02931 0.03520 0.02540 0.02524 0.03705 0.02587	CORN 0:03413 0:03460 0:03201 0:0362 0:01694 0:0220 0:02048 0:01594 0:01991 0:03300 0:02741 0:02129	SUMFAL() 0:02433 0:03396 0:02790 0:02391 0:02028 0:04149 0:032/2 0:027.44 0:018/3 0:013.26	NON AGR 0.01879 0.03479 0.03090 0.02353 0.05324 0.05324 0.05467 0.04221 0.01122 0.01730 0.01277	GRASORG C.03022 C.03025 C.03583 C.02556 C.02746 C.027789 C.02667 C.02378 C.02378 C.02378	ALL GP 0:028405 0:02843 0:02712 0:02051 0:02848 0:02924 0:02626 0:027579 0:02044
STANDARD DE GROUP = ANJARLE 3 R4P1 4 N5P1 5 R6P1 7 R4P2 A N5P2 9 R6P2 10 R4P3 11 R4P3 12 R5P3 13 R6P3 14 R7P3	237, VIATIONS VINTUMET 0.02409 0.03130 0.02418 0.02266 0.02123 0.04402 0.03309 0.03309 0.0363 0.01985 0.02917 0.02370 0.01513 0.01701	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520 0.02837 0.02540 0.02524 0.03705 0.02584 0.03705 0.02584	CORN 0:03413 0:03460 0:03201 0:03682 0:01894 0:0220 0:02048 0:01594 0:01594 0:01594 0:02129	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04199 0:03272 0:02734 0:01873 0:01633 0:01326 0:01332	NON AGR 0.01879 0.03479 0.02090 0.02352 0.02353 0.05324 0.05467 0.04122 0.01122 0.017277 0.01246	GRASORG C.03022 C.03583 C.03125 C.02556 C.02756 C.02759 C.02667 C.02667 C.02795 C.02378 C.023178 C.023178 C.023178	ALL GP 0:03405 0:03405 0:02843 0:02712 0:02051 0:03836 0:02924 0:02622 0:03136 0:02944 0:02044
GHLTS STANDARD DE GROUP = ADJABLE 3 84P1 4 05P1 5 86P1 7 84P2 9 86P2 10 87P2 11 84P3 12 86P3 14 87P3 15 84P4 16 85P4	237, VIATIONS VINTWHET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03063 0.01985 0.02917 0.02370 0.01513 0.01701 0.02950	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520 0.02837 0.02540 0.02524 0.03705 0.02584 0.02584 0.03705 0.02584 0.02584	CORN 0:03413 0:03460 0:03201 0:03682 0:01894 0:0220 0:02048 0:01594 0:01594 0:01594 0:02129 0:02129 0:0214	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04199 0:03272 0:02734 0:01873 0:01663 0:01326 0:01332	NON AGR 0.01879 0.03479 0.02090 0.02352 0.02353 0.05324 0.05467 0.04221 0.01122 0.01730 0.01277 0.01246 0.01962	GRASORG C.03022 C.03583 C.03125 C.02125 C.02752 C.02762 C.02867 C.02867 C.02867 C.02867	ALL GP 0:03405 0:03405 0:028/3 0:02712 0:02051 0:03836 0:02924 0:02622 0:0313 0:02926 0:02044 0:01982
STANDARD DE GROUP = ADJABLE 3 R4P1 A D5P1 5 R6P1 7 R4P2 9 R6P2 10 R7P2 11 R4P3 12 R6P3 13 R6P3 14 R7P3 15 R4P4 16 R5P4	237, VIATIONS VINTWHET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03309 0.0363 0.01985 0.02917 0.02370 0.01513 0.01701 0.02950 0.06026	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520 0.02837 0.02540 0.02524 0.03980 0.02583 0.02583 0.02583	CORN 0:03413 0:03460 0:03201 0:03682 0:01894 0:0220 0:02048 0:01991 0:03300 0:0214 0:02129 0:02214 0:04651 0:0034	SUMFAL() 0:02433 0:03346 0:02770 0:02731 0:02028 0:04149 0:03272 0:027.44 0:61873 0:02375 0:01326 0:01326 0:01322 0:02952 0:00024	NON AGR 0.01879 0.03479 0.02090 0.02352 0.02353 0.05324 0.05467 0.04221 0.01122 0.01730 0.01277 0.01246 0.01962 0.0029	GRASORG C.03022 C.03125 C.02125 C.02759 C.02767 C.02378 C.023795 C.023795 C.023795 C.023795	ALL GP 0:02405 0:02405 0:028/3 0:02712 0:02051 0:02622 0:021376 0:02044 0:02622
GULTS STANDARD DE GROUP = ADJABLE 3 84P1 4 05P1 5 86P1 7 84P2 7 84P2 9 86P2 10 87P2 11 84P3 12 86P3 14 87P3 15 84P4 16 85P4	237, VIATIONS VINTWHET 0.02409 0.03130 0.02418 0.02418 0.02123 0.04402 0.03063 0.01985 0.02917 0.02370 0.01513 0.01701 0.02950	GRASS 0.02695 0.04237 0.03623 0.03234 0.02091 0.03520 0.02837 0.02540 0.02524 0.03705 0.02584 0.02584 0.03705 0.02584 0.02584	CORN 0:03413 0:03460 0:03201 0:03682 0:01894 0:0220 0:02048 0:01594 0:01594 0:01594 0:02129 0:02129 0:0214	SUMFALO 0:02433 0:03396 0:02790 0:02391 0:02028 0:04199 0:03272 0:02734 0:01873 0:01663 0:01326 0:01332	NON AGR 0.01879 0.03479 0.02090 0.02352 0.02353 0.05324 0.05467 0.04221 0.01122 0.01730 0.01277 0.01246 0.01962	GRASORG C.03022 C.03583 C.03125 C.02125 C.02752 C.02762 C.02867 C.02867 C.02867 C.02867	ALL GP 0:03405 0:03405 0:028/3 0:02712 0:02051 0:03836 0:02924 0:02622 0:0313 0:02926 0:02044 0:01982

TEP NUMBER 0			•	
VARIABLE F TO FORCE	*	VARIABLE	F TO FORCE	TOLERANCE
REHOVE LEVEL		· -	ENTER LEVEL	•
DF = 5 655	*		DF= 5 654	
	9	3 54D1	9,947 1	1,000000
•	*	4 B5D1	6,652 1	1,000000
		5 86D1	5,216 1	1,002000
	4	6 87D1	6,708 1	1,000000
	*	7 R4D2	26,490 1	1,000000
•	#	8 R5D2	26,553 1	1,000000
	*	9 B4D2	31,596 1	1,000000
	*	10 57D2	26,750 1	1,000000
	*	11 84D3	12,881 1	1,000000
	•	12 R5D3	52,217 1	1,000000
	<u> </u>	13 B6D3	37,691 1	1,000000
•	*	14 6703	47,493 1	1,000000
		15 84D4	65,769 1	1,000000
•	4	16 8504	158,054 1	1,200000
	<u> </u>	17 B6D4	64,457 1	1,900000
	4	18 B7D4	64,457 1	1,060000
		20 SOIL TYP	2;747 1	1,000000



VARIABLE	F	TO 1	FORCE	•	VARIABLE		F 70	FORCE	TOLERANCE	
		FOVE	EVEL	a.			ENTER	LEVEL		
		648		*		DF=				
3 B4D1		,617	1		5-96D1		0,718	ļ	0.050400	
4 8501		.302	1		6 87D1		0,718		0,090901	
9 6402 12 6503		485	1	- a	7 8402		1,957	- 1	0,235544	
13 BAU3		,413 ,780	1	*	8 55D2 10 87D2		2,958 2,417		0,094129	
16 85D4		469	4	4	10 5712 11 34D3		1,007	1 1	0,200685	
16 8704		859	1	-	14 87D3		1,007		0,237141	
10. 575	U	1000	*		15 64D4		1,142	1	0,191533	
				•	17 86D4 .		0,	-1	0,	
				•	20 SOIL 1	YP	2,185	1.	0,874156	.
U-STATISTIC			ABDA	0,30008	41 DEG	PEES C	F FREED	04	7 5 69	i 4
D-STATISTIC APPROXIMATE			ISDA	25.8			OF FREED			
							ur raceu		35,00 2728) † C Z
MI FROM LINATE	: F-SIAII	2110		2210	en oge	ivees r				
			S OF						<u> </u>	
F - HATRIX			S OF	FREEDOM						
	<u> </u>	DEGRE	S OF						·	
F - MATRIX	์ พากาน 4,50	DEGRE	RASS	FREEDOM	= 7 64	8				
F - MATRI)	4,50 4,50 126,46	DEGREE	RASS	FREEDOM	= 7 64	8				
GRASS GORN SUMFAL	WINTW 4,50 126,46 4,77	DEGREE	RASS 56	FREEDOM CORN 64.53	TO THE SUMFAL	8				
F - MATRI) RRASS GORN SUMFAL NOV AG	WINTW 4,50 126,46 4,77 1.29	16.	RASS 50	GORN 64,53	= 7 64 SUMFAL 0.73	NON				
GRASS GORN SUMFAL	WINTW 4,50 126,46 4,77	DEGREE	RASS 50	FREEDOM CORN 64.53	TO THE SUMFAL	8				
GRASS GORN SUMFAL NON AG GRASOR	4,50 126,46 4,77 1,29 19,42	16. 4. 2.	RASS 50	GORN 64,53	= 7 64 SUMFAL 0.73	NON				
F - MATRI) RRASS GORN SUMFAL NOV AG	4,50 126,46 4,77 1,29 19,42	16. 4. 2.	RASS 50	GORN 64,53	= 7 64 SUMFAL 0.73	NON				
F - HATRIX GRASS GORN SUMFAL VON AG GPASOR CLASSIFIUA	4,50 126,46 4,77 1,29 19,42	16. 4. 2.	RASS 50 10 34	GORN 64,53	= 7 64 SUMFAL 0.73	NON 1,12			NON AGR	GRASORG
F - HATRIX GRASS GORN SUMFAL VON AG GPASOR CLASSIFIUA	4,50 126,46 4,77 1,29 19,42	DEGREE 16. 4. 2. 4.	RASS 50 10 34	CORN 64.53 14.07 112.49	5UMFAL	NON 1,12	AG SUYF	ALO	NON AGR	ÇRASORG
F - MATRIX RRASS CORN SUMFAL VON AG CPASOR CLASSIFIUAT GRO VAPIABLE 3 9401	4,50 126,46 4,77 1,29 19,42 (ION FUNC OUP = W	DEGREE 16. 4. 2. 4. TIONS	RASS 50 10 34	FREEDOM CORN 64,53 14,07 112,49 GRASS 753,43532	= 7 64 SUMFAL 0.73 3.94 CORN	1.12	SU4F	ALO 785	NON AGR 793,82223	GRASORG . 775,98604
F - MATRIX GRASS GORR SUMFAL MON AG GRASOR CLASSIFIUAT GRO VAPIABLE 3 8401 4 8511	4,50 126,46 4,77 1,29 19,42 (10N FUNC OUP = W	DEGREE 16. 4. 2. 4. TIONS	RASS 50 10 34	FREEDOM CORN 64.53 14.07 112.49 GRASS 753.43532 19.30686	0.73 3.94 CORN 757,30	NON 1,12	SUMF 786,56	ALO .788 435	NON AGR 793,82223 8,34824	GRASORG .775,98604 20,99501
F - MATRIX GRASS GORN SUMFAL MON AG GPASOR CLASSIFIUAT GROVAPIAELE 3 8401 4 8501 9 8602	# INTW 4,50 126,46 4,77 1.29 19,42 ÍION FUNC OUP = W 757 30 631	DEGREI 10.4. 2.4. 110NS 11.ThH	RASS 50 10 34	GRASS 753.43532 19.30686 616.59192	7 64 SUMFAL 0.73 3.94 CORN 757,30 55,86 588,96	NON 1.12	SUMF 786,56 7,34 621,62	ALO .788 435	NON AGR 793,82223 8134524 647,55247	GRASORG .775,98604 20,99501 619,27984
F - MATRIX GRASS GORN SUMFAL NOV AG GPASOR CLASSIFIUAT GRO VAPIABLE 3 B401 4 B501 9 B602 12 B583	126,46 4,50 126,46 4,77 1,29 19,42 (ION FUNC OUP = W 757 30 631	DEGREI 10.4. 2.4. 41. TIONS TIONS 11. ThH 1.8461 1.4754 1.1546	TASS 50 10 34 ET 6	FREEDOM CORN 64,53 14,07 112,49 GRASS 753,43532 19,30686 616,59192 326,91360	TOTAL 0.73 3.94 CORN 757.30 55.86 588.96 3290.83	NON 1.12 1.466 6445 6598	SUMF 786,58 7,34 621,62 3360.26	ALO .788 335 938 840	NON AGR 793.82223 8.34524 647.55247 3365.75534	0RASORG .775,98604 20,99501 619,27984 3383,93283
F - MATRIX GRASS GORN SUMFAL NON AG GPASOR CLASSIFIUAT GROVAPIAELE 3 B401 4 B501 9 B602 12 B503 13 B603	126.46 4.50 126.46 4.77 1.29 19.42 (ION FUNC OUP = W 757 30 631 3345 4220	DEGREI 16. 4. 2. 4. TIONS TIONS 10. ThH 1. 4461 1. 4754 1. 1546 1. 3516 1. 3299	TASS 50 10 34 ET 6 6 6 2	GRASS 753.43532 19.30686 616.59192 326,91360 241.10834	TOTAL 0.73 3,94 CORN 757,30 536,96 3290,63 4162,77	1,12 1,12	SUMF 786,55 7.54 621,62 3360.20 4227,01	ALO 785 735 938 840 862	NON AGR 793,82223 8134324 647,55247 3365,75534 4265,80273	GRASORG .775,98604 26,99501 619,27984 3383,93283 4297,32336
F - MATRIX GRASS GORN SUMFAL NOV AG GPASOR CLASSIFIUAT GRO VAPIABLE 3 B401 4 B501 9 B602 12 B583	4,50 126,46 4,77 1.29 19,42 (ION FUNC OUP = W 757 30 634 3345 4220	DEGREI 10.4. 2.4. 41. TIONS TIONS 11. ThH 1.8461 1.4754 1.1546	RASS 56 10 34 ET	FREEDOM CORN 64,53 14,07 112,49 GRASS 753,43532 19,30686 616,59192 326,91360	TORN 757,30 556,86 538,186 54152,77 724,28	1,12 1,12	SUMF 786,58 7,34 621,62 3360.26	ALO 788 335 936 840 862 582	NON AGR 793.82223 8.34524 647.55247 3365.75534	0RASORG .775,98604 20,99501 619,27984 3383,93283

GROUP	PERCENT	NUMBER O	F CASES	CLASSIFIED-	INTO GRO	UP →	
		HINTWHET	GRASS	CORN	SUMFALO	NON AG	R GRASORG
MINTWHET	43,9	104	33	7	31	33	29
GRASS	56,3	1	9	2	4	Q	0
<u> </u>	80.7	3	12	96	3	1	. 4
SHEFALO	28,8	11	1	1	15	8	16
ACL AGR	42,9	.1	0	0	3		0
GPASORG	39,7	26	28	3	43	38	91
		 			20		4.60
	48,2	146	83	109	99	83	140
TOTAL JACKKNIFE GROUP	D CLASSIF	ICATION		CLASSIFIED			
JACKKNIFE	D CLASSIF	LCATION NUMBER C	F CASES	CLASSIFIED	INTO GRO	UP •	· · · · · · · · · · · · · · · · · · ·
JACKKNIFE	D CLASSIF	NOTATION NUMBER C	F CASES		INTO GRO	P - QU	· · · · · · · · · · · · · · · · · · ·
JACKKMIFE GROUP	D CLASSIF PERCENT CORRECT	LCATION NUMBER C	F CASES	CLASSIFIED	INTO GRO	UP •	R GRASCRG
JACKKMIFE GROUP WINTCHET	D CLASSIF PERCENT CORRECT	NOTATION NUMBER C	GRASS 33	CLASSIFIED CORN · 7	INTO GRO	P - QU	R GRASCRG
JACKKMIFE GROUP WINTWHET GRASS	PERCENT CORRECT 43.5 43.8	LUMBER COMMITTEE	F CASES	CLASSIFIED CORN · 7 ?	INTO GRO SUMFALO 32 4 3	P - QU	R GRASCRG 29
JACKKMIFE GROUP WINTEHET GRASS CORN	PERCENT CORRECT 43.5 43.8 79.8	NUMBER CONTINUED TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TOT	GRASS 33 7	CLASSIFIED CORN · 7 2 95 1	INTO GRO SUMFALO 32	NON AG 33 1 1 9	R GRASCRG 29 1
JACKKMIFE GROUP WINTWHET GRASS CORN SUBFALO	PERCENT CORRECT 43.5 43.8 79.8 23.1	NUMBER CONTINUED TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TOT	GRASS 33 7	CLASSIFIED CORN 7 2 95	INTO GRO SUMFALO 32 4 3	NON AG 33	R GRASCRG 29 1 5

STEP		VARI	ABLE	F VALUE TO	NUMBER OF	U-STATISTIC	APPROXIEAT
RHBER		ENTERED	REMOVED	ENTER OR REMOVE	VARIABLES INCLUDED		F-STATISTIC
1	16	R504		158.0540	1	0.4528	158,054
2		P503		16,0506	2	0,4533	75.060
3		R501	 	10,2282	3	0,3739	51,378
. 4		R6D2		10,4756	4	0.3461	40,720
5		94D1		7,2921	5	0,3277	33,854
8	_	R6D3		4.8231	6	0,3160	28,907
7		B7D4		6,8585	7	0,3001	25,824

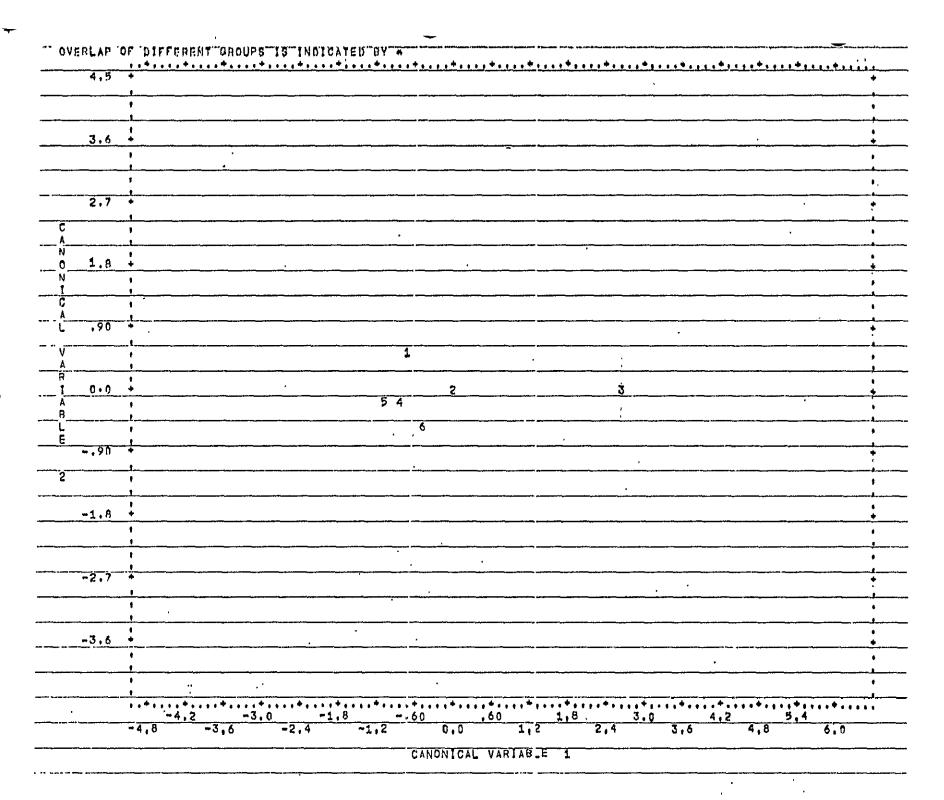
Percent of Variation Between Groups Explained

Eigenvalues	1.59526	0.20544	0.03502	0.02345	0.00558
Percentage	85.55	11.02	1.88	1.26	0.30
Canonical Correla	ations		•		
	0.78402	0.41283	0.18395	0.15137	0.07447

VARIABLE	COEFFICIE	NTS FOR CANO	NICAL VARIABI	LES	
. 3 84ካኒ	-3,52706	-18.71295	-14,03328	~26,53526	23,51809
4 8501	9,82732	11.26195	-4.62781	27.30899	+2,771.66
9 B6D3	-11,33526	9,12132	1.05674	8,35455	27,43358
12 8503	-21,46126	-39,58158	-9,81235	30,72887	14,54999
13 P6P3	-15,83063	-36,52100	21,93465	30,47695	21.22488
16 0504	-22,23767	11.17902	-4,63672	-23,18753	-10,9457
18 8704	-529.16712	<u>-1671,79786</u>	2467.53939	2426,85112	1105,1994
CONSTANT	19,46450	21.50766	-2,76593	-18,27491	+24,63348
GROL:P	CANONICAL VA	RIABLES EVAL	UATED AT GRO	UP MEANS	
MINIMHEL	-0,65465	0,52615	-0,52167	0,05491	≠0,0034 4
GRASS	0.03911	0.08610	1.14026	-0.22403	-0:0569 9
COPN	2,65928	0,05333	-0,03547	-0,61623	6,0077
SUMFALO	-0.85101	-0,13852	-0,18082	+0,48 069	+0,63742
NON AGR	-1,13859	-0.20112	0,14124	-0,18219	0,70621
GRASORG	-0.46871	-ე.540 ⁹ 1	-0.00266	0,08197	•0 i n o 955

GROUP

Winter wheat	-0.66	0.53	Α	1
Grass	0.04	0.09	В	2
Corn	2.66	0.05	С	3
Summer Fallow	-0.85	-0.14	D	4
Non-agriculture	-1.14	-0.20	E	5
Grain sorghum	-0.47	-0.54	, F	6



APPENDIX BB4

Discriminant Analysis of RICE County with 'NON-AGRICULTURAL' Category Not Used to Calculate the Discriminant Function

BMDP7H - STEPWISE DISCRIMINANT ANALYSIS.	
HEALTH SCIENCES COMPUTING FACILITY	
UNIVERSITY OF CALIFORNIA, LOS ANGELES	
IN THIS VERSION OF EMDP7M	
GROUP CODES OR CUTPOINTS MUST BE STATED.	
-	_
PROGRAM CONTROL INFORMATION	
PROBLEM TITLE = 'RICE_CO_SAMP1.1./	
INPUTVARIABLE = 20,	
FORMAT = '(2A5,12F5,0/6F5,0)'.	
CASE = 660.	
UNIT = 12,/-	
VARIAS ADD = 1.	
NAME = 'ROW', 'COLUMN', 'B4D1', 'B5D1', 'B6D1', 'B7D1', 'B4D2',	
185D21,186D21,1P7D21,184D31,185D31,186D31,187D31,184D41,18	5D4++
'86D4', '8704', 'CROP TYP', 'SOIL TYP', 'CROP&SOL',	
USE = 3,4.5,6,7,8,9,10,11,12,13,14,15,16,17,16,20.	
LABEL = 1,2	
GROUP = 'CROP TYPI,	
GROUP CODE = 1,2,3,4,5,8.	
NAME = 'MINTWHET!, 'GRASS', 'CORN', 'SUMFALO', 'NON AGR', 'GRASORG'.	
USE = 'VINTHHET', 'GRASS', 'CORN', 'SUMFALO', 'GRASORG', /	
TRANSFORMATION	
X(21) = X(19) * X(20), /	
SAVE	
UNIT = 10,	
CODE = 'RICE CO'.	
LABEL = 'HICE CO SAMPLE 1 RAW DATA'I/	
PRINT STEP.	•
CLASS = 1.2.3,4.5,6,7.8.9,10,11,12,13,14.15./	
PLOT CANON,	
GROUP = 1,2,3,4,5,6,	
DISCPIMINANI <u>PETHOD = 2.</u>	
FORCE = 0.	
STEP = 40L	
JACK./	
END/	
PROBLEM TITLE RICE CO SAMP. 1.	
MINDER OF VARIABLES TO SELD THE	
NUMBER OF VARIABLES TO READ IN	
TOTAL NUMBER OF VARIABLES	
NUMBER OF CASES TO FEAD IN	
CASE LABELING VARIALLES ROW S	OLUHN
LIMITS AND HISSING VALUE CHECKED BEFORE TRANSFORMATIONS	
INPUT UNIT NUMBER	
REWIND INPUT UNIT PRIOR TO READING DATA YES	
INPUT FORMAT	···
(2A5,12F5,0/6F5.0)	

	8401	4 B5D	_	5 26D1		8701	7 54D2
13	3 85D2 8 86D3 8 87D4	9 96D 14 87D 20 SOI	3	10 B7D2 15 B4D4		84D3 85D4	12 9503 17 8604
TOLERANCE. , .		0,010			-		
F-TO-ENTER		4.000					
F-TO-REMOVE, ;; _wETHOD , , , ,	' t t	3 <u>.</u> 996 2				·	
HAXIHUM FORCED !	EVFL	٥					
MAXIHUM NUMBER (F STEPS	40		•			
_PRIOR, PROBABILII	[[ES	0.20000	<u> </u>	<u> </u>	_0,2¢000	<u> </u>	50000
	BEFORE	TRANSFORMAT	'ION			IVLESÁY	L RANGE
VARIABLE	HUHININ	MUMIXAM	MISSING		CATEGORY	GREATER	LESS THAN
NO. NAME	LIMIT	LIMIT	CODE	CODE	NYKE	THAN	OR EQUAL T
19 CROP TYP				1,00000	PINTRHE	•	
				2.00000	GRASS		
			 	3·00000_			
· 				4.50000 5.00000	SUMFALO NON AGR		
				6. Q0000 6. Q0000	67,4807G	,	
				444040	477,7-07-4		

•	דוורף כב	37.42772	37437209	30141197	37602757	0/14/55/	36.37979	5612/2/4
	_ 16 B5D4	43,65401	35,31250	24.63625	42,55767	41,28571 _	37.80349	37,84380
	17 86D4	48.91561	44.81250	52,45378	46.80769	44.85714	45.52402	48,10260
	18 P7D4	<u>23,86920</u>	22,81250	30,42657	22,5000)	21.71429	22,61135	24,48851
	20 SOIL TYP	2.43038	2,31250	2,51261	2,46151	2,42857	2,29258	2,39643
	19 CROP TYP	1.00000	2·00000 <u>0</u>	3:0000	4 00000	5+00000	00000	4+08270
	COUNTS	237,	16,		52,	7,	229.	653
	STANDARD_I	EVIATIONS	·			******************************		
	GROUP :	<u>WINTWHET</u>	GRASS	CORN	SUMFALO	NON AGR	GRASORG	GPS, US
	3 8401	4.88392		3,50985	2,33883	2,75 <u>1</u> 62 _	3,44731	3,98209
	4 B501	7.55741	5.84772	5,43483	4,16925	3,25137	5.42378	6,22012
	5 A601	7.30671	6.70044	6,94777	4,10347	4,23140	6,33470	6,69259
	5 P7D1	3.74652	4.04918	4.32857	2.58223	2.79455	3.79106	3.82052
	7 8402	4.32294	2.64496	4,26733	4,7593	5,53775	4,53942	4,39533
	8 85n2	8.17013.	5.05964	7,82318	8.4905)	9,92352		8,19422
	9 86n2	6.22021	6.28722	8.32926	6,04283	4,35946	6.47997	6,72657
	10 B7D2	4.57002	4.58258	4,37556	4,01712	5.16398	4,05591	4.31769
	11 B4h3	4,88647	2.70493	3,50195	5.15647	5,52914	5,47210	4,871re
	12 8503	8,44104	5.02286	6,28363	9,2618)	8.09174	10,92489	8,7083
	13 R603	8,12046	6.65833	6,60009	7,94217	6,75419	8,82404	8,08364
	14 8703	4,47825	4.09675	3,93779	3,93403		4.75282	4,43646
	15 R4P4	4,56630	3.32415	3.58519	4,84831	3,73529	4,43160	4,35023
	16 0504	8,23480	6.03013	7,38150	8,48161	6,65117	8,26893	8,04019
	17 ROD4	7.22704	6.15596	6.07125	5,98701	6,36209	7,13931	6,8823
	18 B/D4	3,98989	4,69352	5,,6601	2,83187	3,25137	3.89805	4,1406
	20 SOIL TYP	0,63145	0.47871	0,50195	0,6405L	0,53452	0,56738	0,58477
	19 CROP TYP	0:	D •	0,	0,	0.		0.

CORIL

22 - 47 05 9

20:23529

23.22689

11.42017

34,95798

36,85714

40.39496

20.35294

31 : 52605

27,69748

43,38655

22,48739

30,27731

SÜMFALO

22,48077

19,59615

24.84615

12,80769

35,76923

36,09615

47.38461

24.50000

33,63465

34,55769

38,48671

16.1153!

39,05760

NON AGE

21,71429

18,71429

22,71429

11,85714

33,00000

33,14266

48,71429

26,00000

33,71429

34,14266

39 57143

18,71429

37,42557

GRASORG

23.07170

20.48035

26,03493

13.39738

36,91266

39.02620

47,51965

24,10044

35.72926

37 77729

42,53712

20,17031

36.37555

GPS. US

23,79939

21,86983

26,57274

13,517/1

35,61337

36,41807

46,87055

24,35069

33,51652

33,64319

40.99234

19,96371

36,57274

ORIGINAL

MEANS

.VARIABLE

3 R4D1

4 B501

5 B601

6 B701

7 8402

85p2

9 B6D2

10 B702

11 B4D3

13 8603

15 9404

__12 R5n3

14 B/D3

GROUP #

WINTWHET

25.50633

24.66245

29,10127

14,78059

34.67089

33.84388

26.54008

32,85654

32.75949

38.79747

18,59916

39.45992

49,47257

GRASS

22.81250

19.93750

27.31250

14,43750

34.93750

35.00000

45,93750

24.75000

31.87500

28,81250

41,75000

20.37500

35.37500

VARIABLE F TO FORCE REHOVE LEVEL		AV	RIABLE	TC TER	FCRCE LEVEL	TOLERANCE
DF= 4 649	5			 64		
	Q	3	B4D1	679	. 1	1.000000
	*		B5D1	977	4	1.000000
			B6D1	177	1	1,000000
		6	B7D1	179	-	1,000000
		7	84D2	499	1	1.000000
			8502	872		1,000000
	•		B6D2	123	1	1,000000
	*	10	B7D2	993		1,000000
- · · · · · · · · · · · · · · · · · · ·			B4D3	494	1	1,000000
	*	12		755		1,000000
		13	86D3	360	1	1.000000
	-	14		564		1,000000
	-	15	B4D4	065	•	1.000000
	-	16		159	†	1,000000
			B6D4	129	1	1,000000
			8704	971		1.000000
	-	20		423	₹	1.000000

					•
VARIABLE	F TO FORC	E	VARIABLE	F TO FORCE	
	_ REMOVE_LEVE	L #		ENTER LEVEL	•
	DF= 4 .643	*	DE:	<u> 4 4 </u>	
4 85D1	9,520 1	• 1	3 B4D1	0,744 1	0,089750
6_8701 10_8702	5,831 1 8,757 1	*	_5_86D1 7_84D2	0.3161_	0,061929
12 8503	22,267 1'	•	8 85D2	2,305 1 3,568 1	0,750533
16 B5D4			· · · · · · · · · · · · · · · · · · ·	3,3661_	0,714539/ 0,156438/
18 87D4	42.059 1 64.975 1	*	9 86D2 11 84D3	2,996 <u>1</u> 2,474 1	0,079214
			13 B6D3	2.719	0,453426
		• 0	14 B7D3	2,531 1	0,602599
			15 B4D4	0,596 1	0,091737
•	•	*	17 86D4	1,433	0,085386
# 40 17 <u> </u>		*	20 SOIL TYP	2,591 1	0,853113
	OR WILKS! LAMBDA	0.308191		OF FREEDOM	6 4 648
<u>APPROXIMATE</u>	r-SIAIISIIU	3/152	NEGREES	of FREEDOM	24.00 2244.37
F MATRIX	DEGREES_C	F FREEDOM =	6 643		
	MINTWH GRASS	·-		N AG	
GRASS	WINTWH GRASS 4.03	·-		N AG	
GRASS CORN 1	WINTWH GRASS 4.03 - 41.11 19.70	CORN		N AG	
GRASS	WINTWH GRASS 4.03	·-	SUMFAL NON		
GRASS CGRN1 SUHFAL NON AG	4103 41.11 19.70 6.80 4.40	72.31	SUMEAL NO		
GRASS CORN 1 SUMFAL MON'AG CRASOR	WINTWH GRASS 4.03 19.70 6.80 4.40 1.51 1.73	72.31 14.32	SUMFAL NON		
GRASS GORN 1 SUHFAL MON'AG GRASOR CLASSIFICATI	WINTWH GRASS 4.03 19.70 6.80 4.40 1.51 1.73 22,82 4.47 ON FUNCTIONS	72.31 14.32	SUMFAL NON		GRASORG
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFICATI GROU	WINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 00 FUNCTIONS P = WINTWHET	72.31 14.32 126.50 GRASS	SUMFAL NOT	SUMFALD.	
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFÍCATI GROU VARIABLE 4 8501	WINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 ON FUNCTIONS P = WINTWHET 0.04977	72.31 14.32 126.50 GRASS	SUMEAL NOT 0:42 5:00 0.93 CORN 0:16498	SUMFALO.	0,01279
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFÍCATI GROU VARIABLE 4 8501 .6 8701	VINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 22.82 4.47 0.04977 0.26622	72.31 14.32 126.50 GRASS	SUMFAL NON 0:42 5:00 0.93 CORN 0:16498 0:05795	SUMFALO. -0,07413 _0,20951	0,01279 0,18918
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFÍCATI GROU VARIABLE 4 8501 16 8702	VINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 22.82 4.47 20.04977 0.26622 0.70886	72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674	CORN 0.16498 0.05795 0.45517	SUMFALD. -0.97413 .0.20951 0.62050	0,01279 0,18918 0,66173
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFICATI GROU VARIABLE 4 8501 6 8701 10 8702 12 8503	VINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 22.82 4.47 20.04977 0.26622 0.70886 0.32635	72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838	CORN 0.42 5.00 0.99 CORN 0.16498 0.05795 0.45517 0.26741	SUMFALO0,07413 0,20951 0,62050 0,36254	0,01279 0,18918 0,66173 0,40734
GRASS GORN 1 SUMFAL MON'AG GRASOR CLASSIFICATI GROU VARIABLE 4 R501 6 8/01 10 8702 12 8503 16 8504	VINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 22.82 4.47 20 FUNCTIONS P = WINTWHET 0.04977 0.26622 0.70886 0.32635 0.41178	72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838 0.29889	CORN 0.16498 0.05795 0.45517 0.26741 0.13434	SUMFALD0.97413 0.20951 0.62050 0.36254 0.46432	0,01279 0,18918 0,66173 0,40734 0,35453
GRASS CORN 1 SUMFAL MON'AG GRASOR CLASSIFÍCATI GROU VARIABLE 4 8501 10 8702 12 8503	VINTWH GRASS 4.03 41.11 19.70 6.80 4.40 1.51 1.73 22.82 4.47 22.82 4.47 20.04977 0.26622 0.70886 0.32635	72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838	CORN 0.42 5.00 0.99 CORN 0.16498 0.05795 0.45517 0.26741	SUMFALO0,07413 0,20951 0,62050 0,36254	0,01279 0,18918 0,66173 0,40734

KOUP	PERCENT CORRECT				ED INTO GR	
—		RINTHI	TET GRASS	CORN	SUMFALO	GRĀSORŠ
HINTHHET	43,0	102	33	11	52	39
GRASS	50,0	1	- 8	2	3	2
CORN	76 <u>,5</u>	4	16	91	3	5
SUMPALO	40,4	10	3	1	21	17
NON AGR	:	1	1	0	4	\$
GRASORG	47,6	26	42	2	50	109
POTAL	50.7	144	103	107	133	173
<u></u> -	DEDCENT		AF 61000	A Lecter	ED INTO CO	600
JACKKNIFE GROUP	PERCENT CORRECT	NUMBER			ED INTO GR	
iRoup	PFRCENT CORRECT	NUMBER	HET GRASS	CLASSIFI CORN	SUMFALO	GRASORG
ROUP HINTHHET	PFRCENT CORRECT	NUMBER				
ROUP WINTWHET GRASS	PFRCENT CORRECT 42,6 37,5	NUMBE	HET GRASS	CORN 11 2	SUMFALO	GRASORG 39 2
HINTWHET GRASS CORN	PFRCENT CORRECT 42.6 37.5 75.6	NUMBER WINTWA 101 2 4	HET GRASS 33 6 17	CORN 11	SUMFALO 53 4 3	GRASORG 39 2 5
MINTHHET GRASS CORN SUHFALO.	PFRCENT CORRECT 42,6 37,5 75,6 38,5	NUMBER WINTW	HET GRASS	CORN 11 2 90	SUMFALO 53	GRASORG 39 2
MINTHHET GRASS CORN SUHFALO.	PFRCENT CORRECT 42,6 37,5 75,6 38,5	NUMBE: WINTW) 101 2 4 10	4ET GRASS 33 6 17 3	CORN 11 2 90 1	SUMFALO 534 320 4	GRASORG 39 2 5 18
MINTHHET GRASS CORN SUHFALO.	PFRCENT CORRECT 42.6 37.5 75.6	NUMBER WINTWA 101 2 4	HET GRASS 33 6 17	CORN 11 2 90	SUMFALO 53 4 3	GRASORG 39 2 5

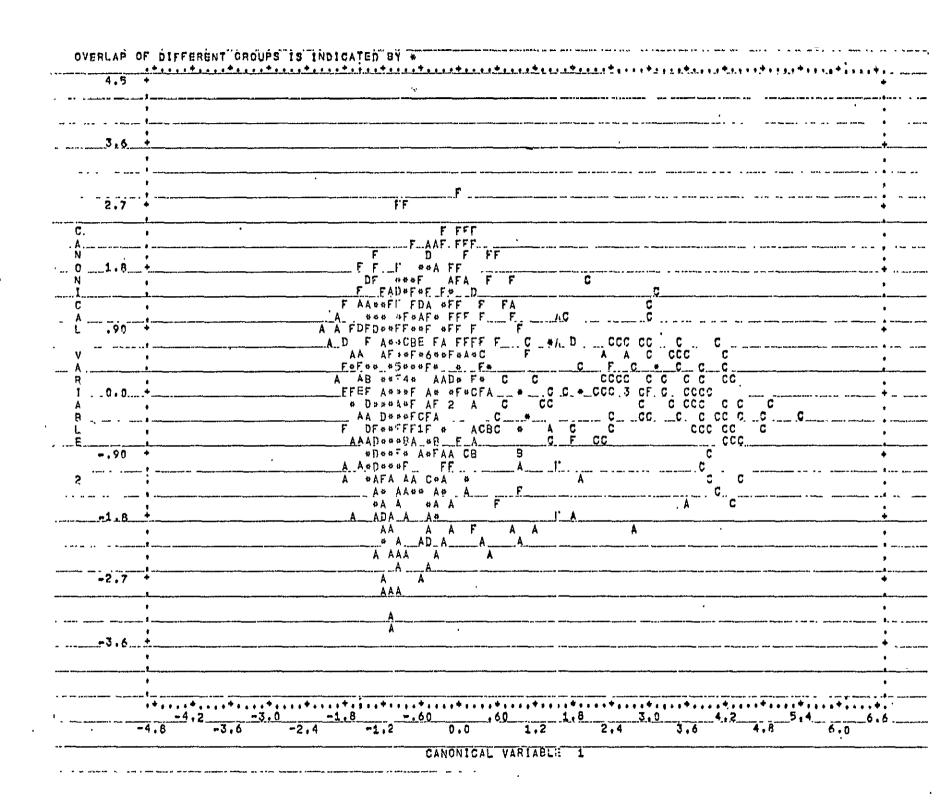
STEP	VAR	IABLE	F VALUE TO	NUMEER OF	U-STATISTIC	TAPPROVITATI
NUMBER	ENTERED	REHOVED	ENTER OR REMOVE	VARIABLES INCLUDED		F-STATISTI
1	16 8504		116.1591	1	0.5824	116,159
2	18 8704		64.5442	2	0,4163	88,946
3	12 8503		25,8983	3	0,3583	67,413
4	4 B5D1	_	9.8387	4	0.3381	52,492
5	10 B7D2		9.4544	5	0,3194	43,899
6	6 B7D1		5.8310	6	0.3082	37,527

Percent of Variation Between Groups Explained

Eigenval ues	1.52504	0.21103	0.03195	0.02824
Percentage	84.90	11.75	1.78	1.57
Canonical Correla	ations			
	0.77715	0.41744	0.17596	0.16573

VARIABLE	CUELLICIEN	TS_FOR_CANON	ICAL VARIABLE	s	<u>.</u>
_ 4 B5D1	0,04604	0,04759	-0.12397	0,10189	
6 R7N1	-0.05456	-0.6878	-0.03482	0,19005	
10 B702	-0.07080	-0.03910	0.10850	0,08512	
12 R503 ,	-0.02892	0.08052	~0.03893	-0,07313	
16 R5N4	-0.08278	-0.n3407	0.10160	-0,05309	
18 8704	0,17102	-0.06715	0,07180	-0.09874	
CONSTANT	1,37220	3.14749	1.53011	4,47417	
GROUP	CANONICAL VAR	TABLES EVALU	ATED AT GROUP	P MEANS	
WINTHHET.	0,65664	0,53291 _	0,04744	0,04085_	
GRASS	-0.10481	-0.17709	-0.02529	1,05887	
CORN	2,69383_	-0.04903	0.02476	-0.02252	-
SUHFALO	-0.83325	0.19772	0,59098	-0.01134	
NON AGR	-0.94528	0.30912	0.40115	0.20100	
GRASORG	-0.47697	0.54448	-0.09620	-0.01743	

GROUP	Mean Coordina	ates	Symbol for Cases	Symbol for Mean
Winter wheat	-0.66	-0.53	Α	1
Grass	-0.10	-0.18	В	2
Corn	2.60	-0.05	С	3
Summer Fallow	-0.83	0.20	D	4
Non-agriculture	-0.95	0.31	E	5
Grain sorghum	-0.48	0.54	F	6



APPENDIX BB5

Discrimination Analysis of RICE County Using Prior Probabilities Proportional to Frequency

BHDP7H - STEPWISE DISCRIMINANT ANALYSIS.
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
IN THIS VERSION OF SHOPTH
GROUP CODES OR CUTPOINTS MUST BE STATED.
PROGRAM CONTROL INFORMATION
PROBLEM TITLE = FRICE_CO.SAMP. 1.1./
INPUT
YARTABLE = 201.
FORHAT = 1(2A5,12F5,076F5,0)1,
CASE = 660:
VARIAB ADD = 1.
NAME = iROW;,;COLUMN;, 18401;,18501;,18601;,18701;,184021;
195D21,186D21,187D21,184D31,185D31,186D31,187D31,184D41,185D41,
'B6D4', B7D4', GROP TYP', SOIL TYP', CROP#SOL',
USE = 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,20.
LABEL = 1,2, GROUP = ICROP TYPI,/
GROUP CODE = 1,2,3,4,5,8.
NAME = !WINTWHET!, !GRASS!, !CORN!, !SUMFALO!,
INON AGRI, GRASORGI.
PRIOR = 0,359, 0.024, 0.180, 0.079, 0.011, 0.347./
TRANSFORMATION X(21). = X(19)*X(20)./
SAVE
UNIT = 10,
CODE = 'RICE CO'.
PRINT STEP.
CLASS = 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,/
PLOT CANON,
GROUP = 1:2:3,4,5,8,
GROUP = 1,2,3,4,8,/
DISCRIMINANT HETHOD = 2.
FORCE = 0: STEP = 40:
JACK./
END/
PROBLEM TITLE
PROBLEM TITLE
NUMBER OF VARIABLES TO READ IV 20
NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS
TOTAL NUMBER OF VARIABLES
NUMBER OF CASES TO READ IN
LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS
INPUT UNIT NUMBER
REWIND INPUT UNIT PRIOR TO READING DATA YES
, augus Panuls
INPUT FORMAT
(2A5,12F5.0/6F5.0)
الأنتيان بين بين بين المستقدين المست

. VARIABLES TO			n.4	5 B6D			8754	: -	
1	3 84D1			_10 B7D			9701 8403	12	94D2 85D3
1	8 B5D2 3 B6D3	9 B67 14 B7		_15 B4D			8504	17	8604
	8B7D4	20 50		76 848					
TCLERANCE,	1 - 2 · 1 - 1 - 1 - 1 - 1	0.010 _							
F-10-ENTER		4.000	-			•			
F-10-REMOVE,		3,996				·			
METHOD .		2	•						
MAXIMUM FORCED		<u>_</u>							
MAXIMUM NUMBER		40	•						
	7150	በ ሄዳልሉላ	ስ ከኃልሰላ	ስ ፋይክስ	0	1.07000	0.01400	6 3476	
SWIDK SKORMAIFT	TIES	0.35900_	0,02 <u>4</u> 00_	0.1800	0	0.07900	0:01100	0.3470	0
salõu hunavatiti				0.1800	0	0.07900			
VARIABLE		_TRANSFORMA	TION MISSING	CÂTEG		CÁTÉGORY	INTE	RVAL R	NGE ESS THAN
			TION				INTE	RVAL R	XGE
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CÂTEG CODE 1.00	ORÝ .	CATEGORY NAME	INTE GREATE THAN	RVAL R	NGE
VARIABLE	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CÂTEG CODE 1.00	089 -	CATEGORY NAME WINTWHE GRASS	INTE GREATE THAN	RVAL R	NGE
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CATEG CODE 1.00	000 _ 000 _ 000 _	CATEGORY NAME WINTWHE GRASS CORN	INTE GREATE THAN	RVAL R	NGE
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CATEG CODE 1.00 2.00 3.00 4.00	08Ý 000 - 000 - 000	CATEGORY NAME WINTWHE GRASS CORN SUMFALO	INTE GREATE THAN	RVAL R	NGE
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CATEG CODE 1.00 2.00 3.00 4.00 5.00	000 _ 000 _ 000 _ 000 _	CATEGORY NAME WINTWHE GRASS CORN SUMPALO NON AGR	INTE GREATE THAN	RVAL R	NGE
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CATEG CODE 1.00 2.00 3.00 4.00	000 _ 000 _ 000 _ 000 _	CATEGORY NAME WINTWHE GRASS CORN SUMFALO	INTE GREATE THAN	RVAL R	NGE ESS THAN
VARIABLE NO. NAME	BEFORE HINIHUM	TRANSFORMA MAXIMUM	TION MISSING	CATEG CODE 1.00 2.00 3.00 4.00 5.00	000 _ 000 _ 000 _ 000 _	CATEGORY NAME WINTWHE GRASS CORN SUMPALO NON AGR	INTE GREATE THAN	RVAL R	NGE ESS THAN

GROUP #	WINTWHET	GRASS	COILN	SUMFALL	NON ASR	GRÄSORG	ALL GP
RIABLE			,				-
3 B4D1	25,50633	22.81250	22,47059	22,48077	21,71429	23,09170	23,77727
4 8501	24,66245	19.93750	20:23529	19,596;5 _	18,71429	20,48035	21,83636
5 86D1	29,10127	27.31250	23,22689	24,84615	22,71429	20,03493	26,53182
6 97D1	14,78059	14,43750	11,42017	12,80709	11,85714	13,39738	13,50000
7 8402	34,67089	34,93750	34,95798	39,76923	33,00000	36,91266	35,57576
8 R5D2	. . 33, 84388 <u> </u>	35,00000	36,85714 _	36,09615	33,14286	39,02620	36,38333
9 B6D2	49,47257	45,93750	40,39496	47,384(1	48,71429	47,51965	46,90000
n 87 n2	26,54008	24.75000	20,35294	24,50000 _	26,00000	24,10044	24,36818
1 B4D3	32,85654	31.87500	31,12605	33,63461	33,71429	35,72926	33,58788
2 R5D3	32,75949	28,81250	27,69748	34,55769	34,14286	37,77729	33,64848
3 8603	38,79747	41.75000	43,38655	38,48077	39,57143	42,53712	40,97727
4 B7 D3	18,59916	20,37500	22,48739	18,11538	18,71429	20,17031	19,85152
5 9404	39.45992	35.37500	30,27731	39,03769	37,42837	36,37555	36,58182
6 B5D4		35,31250	24,63025	42,55769	41,28571	37,80349	37,88030
7 B6n4	48.91561	44.81250	52,45378	46,80749	44.85714	45.52402	48,06818
8 B7D4	23,86920	22,81250	30,42857	22,50000	21,71429	22,61135	24,45909
O SOIL TYP	2,43038	2.31250	2,51261	2,46154	2,42857	2,29258	2,39697
9 CROP TYP		2,00000	3.00000				4,09242
, ,-4, -1,,,							
UNTS	237	16,	119	. 52,	7 .	229,	660
. STANDARD_DE	VIATIONS						
GROUP		GRASS					ALL GP
GROUP	WINTPHET	GRASS	CO 3N	SUMFALO	NON AGR	GRASORG	ALL GP
GROUP H	WINTWHET	GRASS	CORN	SUMFALO	NON AGR	GRASORG	ALL GP
GROUP.H RIABLE 3 B4D1	WINTWHET 4.88392 7.55741	GRASS 3.69177 5.84772	CORN 3,50985 5,43483	SUMFALO 2.33885 4.16926	NON AGR	GRASORG 3,44701 5,42378	ALL GP 3;97254 6;19935
GROUP # RIABLE 3 B4D1	WINTWHET 4.88392 7.55741 7.30671	GRASS 3.69177 5.84772 6.70044	CORN3,50985 5,434836,96777	SUMFALO	NON AGR	GRASORG	ALL GP 3,97254 6,19935 6,67413
GROUP.H RIABLE 3 84014 8501 5 86016 8701	WINTWHET 	GRASS	3,50985 5,43483 6,96777 4,39857	SUMFALO 2.33885 4.16926 4.10349 2.58226	NON AGR	GRASORG	ALL GP 3,97254 6,19935 6,67413 3,81236
GROUP #	4.88392 7.55741 7.30671 3.74652 4,32294	GRASS	3,50985 5,43483 6,96777 4,39857 4,26733	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75947	NON AGR 2,75162 3,25137 4,23140 2,79455 5,53775	GRASORG3,44701 5,42378 6,33970 3,79106 4,53942	3,97254 6,19935 6,67413 3,81236 4,40696
GROUP #	4.88392 7.55741 7.30671 3.74652 4,32294 8,17013	GRASS	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75947 8,49050	NON AGR 2,75162 3,25137 4,25140 2,79455 5,53775 9,92352	GRASORG3,44701 5,42378 6,33970 3,79106 4,53942 8,77093	3,97254 6,19935 6,67413 3,81236 4,40696 8,21174
GROUP #	4.88392	GRASS	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75947 8.49080 6.04283	NON AGR 2,75162 3,25137 4,25140 2,79455 5,53775 9,92352 4,30946	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097	ALL GP 3,97254 6,19935 6,67413 3,812124 4,40696 8,21174 6,70836
GROUP H RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 B4D2 8 E5D2 9 B6D2 0 B7D2	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75937 8,49080 6.04283 4.01712	NON AGR 2,75162 3,25137 4,23140 2,79455 5,53775 9,92332 4,30946 5,16398	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097 4,05591	ALL GP 3,97254 6,19935 6,67413 3,816743 4,40696 8,21174 6,70836 4,32558
GROUP H RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7 D1 7 B4D2 8 B5D2 9 B6D2 0 B7D2 1 B4D3	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57062 4.86647	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,26733 7,267318 8,32926 4,37556 3,50195	SUMFALO 2,33885 4,16926 4,10349 2,58226 4,75947 8,49030 6,04283 4,017.2 5,15649	NON AGR 2,75162 3,25137 4,23140 2,75475 5,53775 9,92332 4,30946 5,16398 5,52914	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097 4,05591 5,47210	ALL GP 3,97254 6,19935 6,67413 3,810696 8,21174 6,70836 4,32558 4,87750
GROUP E RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 4D2 8 B5D2 9 B6D2 0 B7D2 1 B4D3 2 B5D3	WINTWHET	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.058722 4.58258 2.70493 5.02286	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,267318 8,32926 4,37556 3,50195 6,28363	SUMFALO 2,33885 4,16926 4,10349 2,58226 4,75947 8,49080 6,04283 4,01712 5,15649 9,26100	NON AGR 2,75162 3,25137 4,23140 2,79455 5,53775 9,92352 4,30946 5,16398 5,52914 8,09174	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097 4,05591 5,47210 10,02489	3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,10836 4,32558 4,87750 8,70289
GROUP E RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 A4D2 8 B5D2 9 B6D2 0 B7D2 1 B4D3 2 B5D3 3 B6D3	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002 4.86647 8.44104 8,12046	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,50195 6,28363 6,60009	SUMFALU 2,33885 4,16926 4,10349 2,58226 4,75947 8,49030 6,04733 4,017:2 5,15649 9,26100 7,942:7	NON AGR 2,75162 3,25137 4,23140 2,79455 5,53775 9,92332 4,16398 5,16398 5,16398 6,79419	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097 4,05591 5,47210 10,02409 8,82404	3,97254 6,19935 6,67413 3,81256 4,40696 8,21174 6,70836 4,32558 4,07750 8,70289 8,07184
GROUP E RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 94D2 8 B5D2 9 B6D2 9 B7D2 1 B4D3 2 B5D3 3 B6D3 4 B7D3	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002 4.8647 8.44104 8.12046	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833 4.09675	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,528363 6,60009 3,93779	SUMFALU 2.33885 4.16926 4.10349 2.58226 4.75937 8,49050 6.04283 4.017:2 9,15649 9,26100 7,94217 3,93403	NON AGR 2,75162 3,25137 4,23140 2,79455 5,53775 9,92352 4,30946 5,163794 6,78419 3,45033	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47097 4,05591 5,47210 10,02409 6,82404 4,75282	3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,70856 4,32558 4,87750 8,7750 8,7750 8,77184
GROUP E RIABLE 3 B4D1 4 B5D1 5 B6D1 6 B7D1 7 94D2 8 B5D2 9 B6D2 9 B7D2 1 B4D3 2 B5D3 3 B6D3 4 B7D3 5 B4D4	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002 4.8647 8.44104 8.12046 4.47825 4,56630	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833 4.09675 3.32415	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,528363 6,60009 3,93779 3,56519	SUMFALU 2,33885 4,16926 4,10349 2,58226 4,75947 8,49030 6,04732 4,01732 5,15649 9,26100 7,94237 3,93403 4,84834	NON AGR 2,75162 3,25137 4,23140 2,75455 5,53775 9,92352 4,303746 5,162914 8,75419 3,45033 3,73529	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77097 4,05591 5,47210 10,02409 6,82404 4,75282 4,43160	ALL GP 3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,32558 4,37750 8,77289 8,07184 4,42841 4,34497
GROUP E GROUP	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.8647 8.44104 8.12046 4.7825 4.56630 8.23480	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833 4.09675 3.32415 6.03013	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,58363 6,60009 3,93779 3,56519 7,18150	SUMFALO 2,33885 4,16926 4,10349 2,58226 4,75937 8,49080 6,04283 4,01712 5,15649 9,26180 7,94217 3,934834 8,48161	NON AGR 2,75162 3,25137 4,25140 2,75455 5,53775 9,92352 4,303746 5,16374 8,09174 6,78419 3,45033 3,73529 6,65117	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77093 6,47210 10,02409 8,82404 4,75282 4,43160 8,26803	ALL GP 3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,70856 4,37550 8,70750 8,70784 4,47841 4,34497 8,02854
GROUP E GROUP	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002 4.57002 4.8647 8.44104 8.12046 4.47825 4,56630 8,23480 7,22704	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833 4.09675 3.32415 6.03013 6.15596	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,501595 6,28363 6,60009 3,93779 3,56519 7,18150 6,07125	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75937 8.49050 6.04283 4.017:22 5.15649 9.26100 7.94403 4.84834 8.48161 5.98744	NON AGR 2,75162 3,25137 4,25140 2,75455 5,53775 9,92352 4,3037946 5,163948 5,52914 8,09174 6,78419 3,45033 3,73529 6,65117 6,36209	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77097 4,05591 5,47210 10,02409 8,82404 4,75282 4,75282 4,26803 7,13931	ALL GP 3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,32558 4,87750 8,77289 8,07184 4,42841 4,34497 8,02854 6,87773
GROUP E GROUP	4.88392 7.55741 7.30671 3.74652 4.32294 8.17013 6.22021 4.57002 4.8647 8.44104 8.12046 4.7825 4.56630 8.23480 7.22704 3.98989	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.702286 6.65833 4.09675 3.32415 6.03013 6.15596 4.69352	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,58363 6,60009 3,56519 7,18150 6,07125 5,16601	SUMFALO 2:33885 4:16926 4:10349 2:58226 4:75937 8:49080 6:04283 4:017:2 5:15649 9:26100 7:94403 4:54834 8:48161 5:98744 2:83139	NON AGR 2.75162 3.251340 2.75455 5.53775 9.3346 5.163914 6.163914 6.175419 3.75529 6.36209 3.25137	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77097 4,05591 5,47210 10,02409 8,82484 4,75282 4,75282 4,26803 7,13931 3,89805	ALL GP 3,97254 6,19935 6,674136 4,40696 8,21174 6,70836 4,32558 4,07750 8,70289 4,42841 4,42841 4,4497 8,02854 6,87773 4,13336
RIABLE 3 84D1 4 85D1 5 86D1 6 87D1 7 94D2 8 85D2 9 86D2 0 87D2 1 84D3 2 85D3 3 86D3 4 87D3 5 84D4	4.88392 7.55741 7.30671 3.74652 4,32294 8.17013 6.22021 4.57002 4.57002 4.8647 8.44104 8.12046 4.47825 4,56630 8,23480 7,22704	GRASS 3.69177 5.84772 6.70044 4.04918 2.64496 5.05964 6.28722 4.58258 2.70493 5.02286 6.65833 4.09675 3.32415 6.03013 6.15596	CORN 3,50985 5,43483 6,96777 4,39857 4,26733 7,22318 8,32926 4,37556 3,501595 6,28363 6,60009 3,93779 3,56519 7,18150 6,07125	SUMFALO 2.33885 4.16926 4.10349 2.58226 4.75937 8.49050 6.04283 4.017:22 5.15649 9.26100 7.94403 4.84834 8.48161 5.98744	NON AGR 2,75162 3,25137 4,25140 2,75455 5,53775 9,92352 4,3037946 5,163948 5,52914 8,09174 6,78419 3,45033 3,73529 6,65117 6,36209	GRASORG 3,44701 5,42378 6,33970 3,79106 4,53942 8,77097 4,05591 5,47210 10,02409 8,82404 4,75282 4,75282 4,26803 7,13931	ALL GP 3,97254 6,19935 6,67413 3,81236 4,40696 8,21174 6,32558 4,87750 8,77289 8,07184 4,42841 4,34497 8,02854 6,87773

STEP NUMBER 0				•
VARIABLE F TO FORCE	*	VARIABLE	F TO FORCE	TOLERANCE
REKOVE_LEVEL	*		ENTER LEVEL	
DF# 5 655	9		DF# 5 654	
	*	3 B4D1	14,593 _1	_ 1,000000
		4 B5D1	15,643 1	1,000000
	* <u></u>	5_86D1	14,280 _ 1	1,900000
•	*	6 B7D1	13,261 1	1,000600
·		7 B4D2	7,246 . 1	1,000000
		8 B5D2	9,678 1	1,000000
		9 B6D2	29,963 1	1,000000
	#	10 B7D2	32,857 1	1,000500
		11 B4D3	16,3531	1,600000
	*	12 B5D3	23,037 1	1,000000
<u> </u>	. #	13 B6D3	8,3541	1,000500
	+	14 B7D3	14,196 1	1,000000
		15 B4D4	74,6861	1,000000
	•	16 B5D4	93,452 1	1,000000
	4	17 Bob4	<u> </u>	1,000000
	*	18 B7D4	63,221 1	1,000000
	4	20 SOIL PY	p 2,747 1	1,000000

VARIABLE	F	70 i	FORCE		VARTABLE	=	F TO	FURCE	TOLER	ANCE	
		HOVE			"i Diritore	b	ENTER		_ ; • # • ,	A-104	
	DF# 5	649				DF=	5 648				
4 65D1	7	.956	1	A	3 84D1		0,602	1	0,09	1205	-
6 B7D1 <u></u>		.899_	_1_	<u> </u>	_5 B6D1		0.374_	1		1799_	·····
10 B702		143	1	4	7 B4D2		2,343	ĭ		0391	
_12 B5D3		955	1	<u> </u>	8 B5D2		2,936	. 1	0,71	2985	
16 B504		177	1	*	9 B6D2		2,290	1	0,15	865	
_18_8704	<u>5</u> 3	.201_	1		_11 B4D3		2,018	1		8758 _	
				•	13 B6D3		2,189	1		1416	
				-	_14_B?D3		2,041_	1		0939	
				•	15 B4D4		0,847	1		1606	
	·- ·				17 B6D4		1,186			5686	<u> </u>
		٠		•	50 SOIF	TYP	2,187	1	0.85	5998	
U-STATISTIC (יווע פו	SILA	uph.	0.30604			ÖF FREED	10 2		654	
APPROXIMATE_P											00
	-STATI	STIC		29.8	52 D	P 14 17 14 15 11					
								<u> </u>	56'3'A'R'''	<u> </u>	u u
E + HATRIX		DEGRE	EŞ_QĒ	FREEDOM	=6	649					
.E. ÷ HATRIX .		DEGRE	EŞ_QĒ		=6	649					
.F. + HATRIX .	 	DEGRE	ES_OE Rass_	FREEDOM	=6	649	_AG				
GRASS	WINTW 4.04	DEGRE	ES_0E Rass_ 83	FREEDOM:	=6	649					
GRASS CORN1	WINTH 4,04 11.99	DEGRE	E\$_QE RAS\$_ 83 41	FREEDOM: CORN.	SUMFA	649					
GRASS CORN1' SUMFAL NON AG	WINTW 4,04 41.99 6.82 .1.52	DEGRE	ES_OF RASS_ 83 41 73	FREEDOM:	SUMFA	649 LNON	_AG				
GRASS CORN1' SUMFAL NON AG	WINTH 4,04 11.99	DEGRE	ES_OF RASS_ 83 41 73	FREEDOM: CORN.	SUMFA	649	_AG				
GRASS CORN1 SUMFAL NON AG GRASOR		DEGRE	ES_OF RASS_ 83 41 73 48	FREEDOM:	SUMFA	649 LNON	_AG				
GRASS CORN1 GRASS SUMFAL NON AG GRASOR CLASSIFICATIO	WINTW 4,04 41.99 6.82 1.52 22.90	DEGRE	ES_OF RASS_ 83 41 73 48	72,81. 14:41 127.45	SUMFA 0:42 5:02	649 LNON 0.97	_AG				
GRASS CORN1 SUMFAL NON AG GRASOR CLASSIFICATIO	WINTH 4,04 1,99 6.82 1,52 22,90 DN FUNC	DEGRE	ES_OF RASS_ 83 41 73 48	FREEDOM:	SUMFA	649 LNON 0.97	_AG				
GRASS CORN1 SUMFAL NON AG GRASOR CLASSIFICATIO	WINTH 4,04 11,99 6.82 1:52 22,90 DN FUNC	DEGRE	ES_OF RASS_ 83_ 41 73_ 48 ET	72,81. 14:41 127.45	SUMFA 0:42 5:02	649 LNON 0.97	_AG	ALO		AGR	
GRASS CORN1 SUMFAL NON AG GRASOR CLASSIFICATIO GROUP VARIABLE 4 B5D1	WINTH 4,04 41,99 6.82 1:52 22,90 DN FUNC	DEGRE	ES_OF RASS_ 83_ 41 73_ 48 ET	72,81. 14:41 127.45	SUMFA 0:41 5:02	649 LNON 0.97	SUHF	ALO	NON -0, 67	AGR	GRASORG 0.01566
GRASS CORN1 SUMFAL NON AG GRASOR CLASSIFICATIO GROUP VARIABLE 4 B5D1	WINTH 4,04 41,99 6,82 1,52 22,90 ON FUNC	DEGRE	ES_OF RASS_ 83_ 41 73_ 48 ET	TREEDOM: 72.81. 14:41 127.45 GRASS *0.05205	5,02	0.97	SUHF	ALO 6958	NON -0, 67	AGR 7025	GRASORG 0.01566
GRASS CORN16 SUMFAL NON AG GRASOR CLASSIFICATIO GROUP VARIABLE 4 B5D1 10 B7D2	WINTH 4,04 41,99 6.82 1:52 22,90 ON FUNC	DEGRE 19. 1. 4. TIONS 11NTWH 1.0547 1.2682	ES_OF RASS_ 83_ 41_ 73_ 48 ET	TREEDOM: 72.81. 14:41 127.45 GRASS *0.05205 0.42131	SUMFA 0:42 5:02 CO 0:	0.97 RN 17085 05637	SUMF	ALO 6958	NON -0.07	AGR 7025 1272	GRASORG 0.01566 0.19768 0.66649 0.40761
GRASS CORN16 SUMFAL NON AG GRASOR CLASSIFICATIO GROUP VARIABLE 4 B5D1 10 B7D2	WINTH 4,04 41,99 6.82 1:52 22,90 ON FUNC 0	DEGRE 19. 4. 11. 4. TIONS 11. 10. 11. 10. 11. 11. 11. 11.	ES_OF RASS_ 83_ 41_ 73_ 48 ET	CORN 72.81. 14:41 127.45 GRASS *0.05205 0.42131 0.74985	5,02	0.97 RN 17085 05637 45993	SUMF	ALO 958 081 083	NON -0,67	AGR /025 272 107 743	GRASORG 0.01566 0.19768 0.66649 0.40761 0.35039
GRASS CORN16 SUMFAL MON AG GRASOR CLASSIFICATIO GROUP VARIABLE 4 B501 10 B702 12 B503	WINTH 4,04 41.99. 6.82 1.52 22.90 ON FUNC 0	DEGRE 19. 4. 11. 4. TIONS 11. 11. 11. 11. 11. 11. 11. 11	ES_OF RASS_ 83_ 41_ 73_ 48 ET	CORN 72.81. 14.41 127.45 GRASS *0.05205 0.42131 0.74985 0.25816	5,02	0.97 RN 17085 05637 45993 26652	SUMF	ALO 958 081 083	NON -0.67 0.14 0.78	AGR 1025 1272 107 1743 1394	GRASORG 0.01566 0.19768 0.66649 0.40761

GROUP	PERCENT _CORRECT_	NUMBER O	F CASES	CLASSIFIED	INTO GRO	UP -	
		RINTHHET	GRASS	CORN	SUMFALO	NON AGR	GRASORG
NINTWHET	63,7	_151	1	11	0	_ 0	_ 74
GRASS	0,	8	٥	5	ð	Ô	6
CORN	79 .8	12	0	95		0	12
SUMFALO	ο,	21	0	1	0	ວີ	30
NON AGR_	0	2	0		0	0	5. <u>_</u>
GRASORG	70.7	61	0	8	0	Ō	162
TOTAL	61,8	255	1	115	0	0	289
JACKKNIFE	CLASSIF	ICATION			•		
	~:					<u> </u>	
ROUP	PERCENT	NUMBER O	F CASES	CLASSIFIED	INTO GRO	UP .	
ROUP	PERCENT	NUMBER O		CUASSIFIED		· 	GRASORG
ROUP WINTWHET	CORRECT					· 	GRASORG
	_62.9	WINTWHET		CORN 11 2		· 	GRASORG
WINTWHET	CORRECT_62.9	WINTWHET 149 8				· 	GRASORG 75 6
WINTWHET GPASS	_62.9	WINTWHET		CORN 11 2		· 	GRASORG -75 6 -12
WINTWHET GPASS CORN	62.9 0, 79.8	WINTWHET 149 8		CORN 11 2		· 	75 6 12
WINTWHET GPASS CORN SUHFALO	62.9 0,8	WINTWHET 149 8		CORN 11 2		· 	75 6 12

STEP	VARIABLE	F VALUE TO	NL HBER OF	U-STATISTIC	APPROXIHAT
NUKSER	_ENTEREDREHOVED	ENTER OR REMOVE_	YARIAPLES INCLUDED	0-011:12:16	F=STATISTI
2 1	6 R5D4	93,4517	1	0,5833	93,452
	2 B5D3	52,6907	22	0.4156	71,984
	4 B5D1	20,9253	3	0,3581	54,080
5 1		8,4599 7,6480		0.3365	42,014
6	5_B7D1	4.8988	2	0.3175 0.3060	34,960 29,832

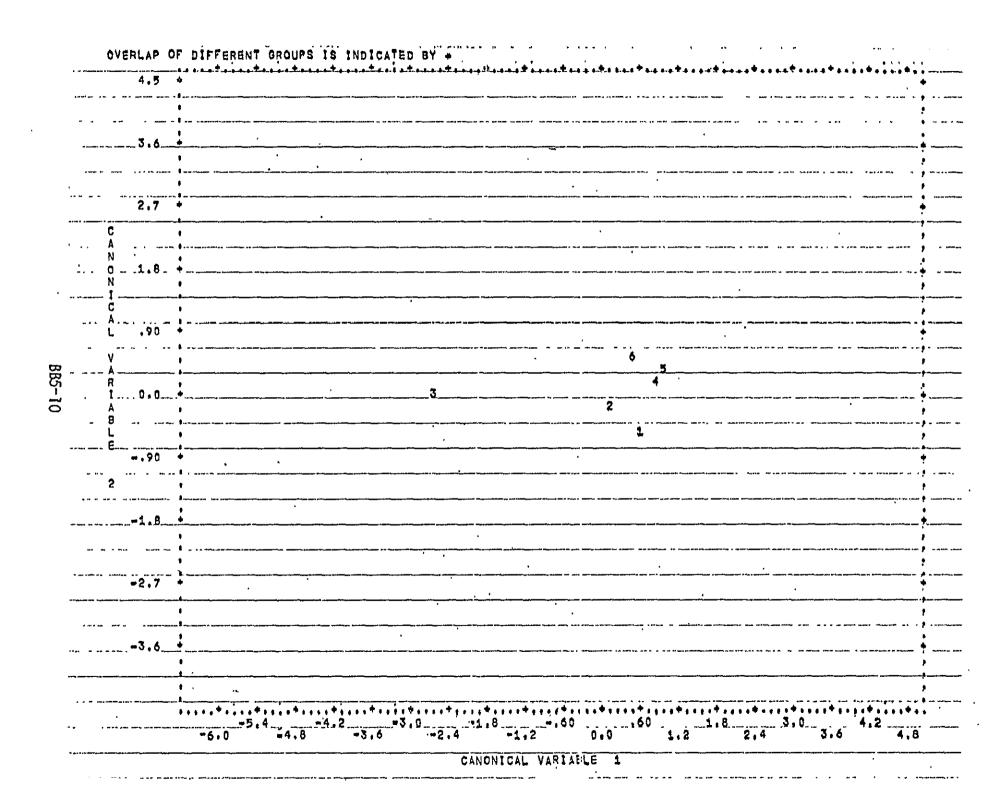
Percentage of Variation Between Groups Explained

Eigenvalues	1.53071	0.21092	0.03385	0.02832	0.00293
Percentage	84.72	11.67	1.87	1.57	0.16
Canonical Correlatio	n 0.7777 2	0.41735	0.18094	0.16595	0.05406

VARIABLE	COEFFICIEN	L'à 'É ÒS" C'YÑON	ICAL VARIABL	ES	· · · · · · · · · · · · · · · · · · ·
4 85D1	0.04654	0.04834	0.13858	0.07601 _	-0,02882
6 B7P1	0,05429	-0,07122	0,01412	0,18839	0,20957
<u> 10 8702 </u>	0.07034	<u></u> 0,03613	0,07351	0.10894	0,2023 <u>i</u>
12 B5D3	0.02899	0,07962	0.05281	-0.06415	-0,03539
16 8504	0,08263_	0,03455	0,08581	0.07210 _	0,04491
18 R7 <u>n</u> 4	-0,17131	-0.06695	-0.05022	-0,10976	0,02305
CONSTANT	-1.34590	3,16445	-2,30597	4,03609	0,64621
GROUP	CANONICAL VAR	TABLES EVALU	ATED AT GROU	P MEANS	
WINTWHET	0.64311	0.53704	0.05662	-0.03145	0,00198
GRASS	0.09584	-0:17488	-0.17418	1:03864	0:04672 %
CORN			- 0.02546 _	0,02567	_ =0.G0277
SUMFALO	0.82440	0,19477	, , ,	-0,12632	0.05280
NON_AGR	_0.93682	0.31443	0.46417	0.12960	
. GRASORG	0.46860	0.53763	0.10837	-0.00195	0.00344

GROUP	Mean Coordi	inates	Symbol for Cases	Symbol for Mean
Winter wheat	0.65	-0.54	Α	1
Grass	0.10	-0.17	В	2
Corn	-2.61	-0.05	С	3
Summer Fallow	0.82	0.19	D	4
Non-agriculture	0.94	0.31	E	5
Grain sorghum	0.47	0.54	F	6

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR



APPENDIX BB6

Discrimination Analysis of RICE County With Prior Probabilities and 'NON-AGRICULTURAL' Category Not Used to Calculate the Discrimination Function

	•
BHOPTH - STEPWISE DISCRIMINANT ANALYSIS.	
HEALTH SCIENCES COMPUTING FACILITY	
UNIVERSITY OF CALIFORNIA, LOS ANGELES	
CONTROL TO THE CONTROL OF THE PARTY OF THE P	
IN THIS VERSION OF BMDF7M	
GROUP CODES OR CUTPOINTS MUST BE STATED.	
•	
PROGRAM CONTROL INFORMATION	
PROBLEM TITLE = 'RICE CO SAMP. 1/	
INPUT	_
VARIABLE = 20.	
FORMAT = '(2A5,12F5.0/8F5.0)'.	
CASE = 660.	
. UNIT = 12./	
VARIAB ADD = 1.	
NAME = "ROY", "COLUMN", "84D1", "85G1", "86D1", "87D1",	
B502, *8602*, *8702*, *8403*, *8503*, *8603*, *8703*, *	840 + 9 85 D4 9
B604, *B704*, *CROP TYP*, *SOIL TYP. , *CROP*SOL .	
USE = 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,20.	
LABEL = 1,2.	
GROUP = "CROP TYP"./	
GROUP CODE = 1,2,3,4,5,8.	
NAME = "WINTWHET", "GRASS", "CORN", "SUMFALO",	
"NON AGK", "GRASORG".	
USE = "HINTWHET", "GRASS", "CORN", "SUMFALO", "GRASORG".	
PRIOR = 0.359, 0.024, 0.180, 0.079, 0.011, 0.347./	
TRANSFORMATION	
X(21) = X(19)*X(20)./	
SAVE	
UNIT = 10.	
CODE = "RICE CO".	
LABEL = "RIGE CO SAMPLE 1 RAW DATA" ./	
PRINT STEP.	
CLASS = 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15./	
PLOT GANON.	·
GROUP = $1,2,3,4,5,8$.	
GROUP = 1,2,3,4,8./	
DISCRIMINANT METROD = 2.	
· FORCE = 0.	
STEP = 40.	-
JACK./	
END/	
· · · · · · · · · · · · · · · · · · ·	
Anab. B Tab. 5	
PROBLEM TITLE RICE CO SAMP. 1.	
AUTHORO OF MEDICAL TO TO PORT OF TO	2
	<u> </u>
	1
The state of the s	1
NUMBER OF CASES TO READ IN	
CASE LABELING VARIABLES	CCLUHN
	_ •
	.2
REWIND INPUT UNIT FRIOR TO READING DATA YE	.5
INPUT FORMAT	
. (2A5:12F5:0/6F5:0)	

VARIABLES TO									
	3 54D1	4 858		5_			8791	7	8402
	8 - B5D2	9 86		-	B702		8403		B503
	3 B6D3	14 870		15	8484	16	8504	17	8604
ę - <u>λ</u> .	8 6754	2 ú S0.	IL TYP					=	
TOLERANCE	• • • • •	0.010						<u> </u>	
F-TO-ENTER		4.000			•	-			
F-TO-REMOVE		3.996	,			·			
METHOD	• • • • •	2							
MAKINUM FORCED		0							
MAXINUM NUMBER (OF STEPS	48					_		
PRIOK PROBABILI	TIES	0.35900	0.02400	0.	18000	0.07900	0.01186	9.3476	6
	SEFORE	TRANSFORMAT	TON			·	TNTH	RVÆLTRA	NGF
VARIABLE	MINIHUM	MUHIKAM	HISSING	C	ATEGORY	CATEGORY	GREATE		ESS THAN
NO. NAME	LIMIT	LIMIT	COUE	C	00E	NAKE	NART		R EQUAL YO
13 CROP TYP					1.00000	WINTHE			
					2.00000	GRASS	•		
					3.00.00	CORN			
	-	•	•		4.05000	SUFFALO			
		-			5.00000	NON AGR			
					8.00005	GRASORG			

GKOUP #	WINTWHET	GRASS	CORV	SUM FALO	NON AGR	GRASORG	GPS. US
ARIABLE					4		_
3 B4C1	25.50633	22.81250	22.47059	22.48077	21.71429	23.09170	23.79939
4 8501	24.66245	19.93750	20.23529	19.59615	18.71429	20.48335	21.86983
5 8601	~ 29.10127	27.31250	23.22689	24.84615	22.71429	26.03493	26.57274
6 8701	14.78059	14.43750	11.42617	. 12.84769	11.85714	13.39738	13,51761
7 B4C2	34.67069	3+.93750	34.95798	35.76923	33.00000	36.91266	35.60337
8 8502	33.84368	35.00000	36.85714	36.09615	33.14286	39.02620	36.41807
9 B602	49.47257	45.93750	43.39496	47.33401	46.71429	~ ~~47.51965 ^{~~}	~~~46.88155
10 8702	26.54008	24.75000	20.35294	24.50000	26.00000	24.10344	24.35069
11 B4D3	32.85654	31.87500	31.12605	33.63461	33.71429	35.72926	33.20052
12 8503	32.75 949	28.81250	27.69748	34.55709	34.14286	37.77729	33.64319
13 8603	38.79747	41.75000	43.38655	38.48077	39.57143	42.53/12	40.99234
14 8703	18.59916	20.37500	22.48739	18.11538	18.71429	. 20.17031	19.86371
15 8404	39.4592	35.37500	36.27731	39.05769	37.42857	36.37555	36.57274
16 8504	43.65411	35.31250	24.63025	42.55769	41.28571	37.80349	37.84380
17 B604	48.91561	44.61250	52.45378	46. 80769	44.85714	45.52402	48.10260
18 B7D4	23.86920	22.81250	30.42357	22.50010	21.71429	22.61135	24.48651
20 SOIL TYP	2.43038	2.31250	2.51261	2.46154	2.42657	2.29258	2.39663
19 CROP TYP	1.00000	2.00000	3,00000	4.00000	5.00000	8 • 00000	4.08270
DUNTS	237.	16.	119.	52.	7	220	
OUNTS		10.	119.			229.	
STANDARD DE	VIATIONS						
,						6010006	CCC 440
GROUP =	WINTWHET	GRASS	CORN	SUMFALO	NON AGR	GRA SORG	EU. 299
ARIABLE		a co	* ***	0.77.05	0 70100	7 704	* 00000
3 B401	4.88392	3.69177	3.50985	2.33685	2.75162	3.44701	3.98209
4 B501	7.55741	5.84772	5,43483	4.16926	3.25137	5. 42378	6.22012
5 B6C1	7.36 €71	6.70044	6.96777	4.10349	4.23140	6.33970	6.69259
6 8701	3.74652	4.04916	4.39957	2.50225	2.73455	3.79106	3.82.52
7 8402	4.32294	2.64496	4.26733	4.75937	5.53775	4.53342	4.39513
8 6502	d.17G13	5.05964	7.22318	8.49050	9.92352	8.77093	6.19422
9 8602	6.22021	6.28722	8.32926	6. 14283	4.30946	6.47097	6.72657
10 8762	4.57002	4 • 5 6 2 5 8	4.37556	4.01712	5.16398	4.05591	4.31705
11 B4D3	4.88647	2.70493	3.50195	5.156+9	, 5.52914	5.47213	4.87136
12 8503	8.44104	5.02286	6.28363	9. 26130	8.09174	10.02489	8.70835
13 8603	8.12046	6.65833	6.60009	7.94217	6.75419	8.82+04	8.08304
14 8703	4.47825	4.09675	3.93779	3.93403	3.45033	4.75282	4.43646
15 B4D4	4.56636	3.32415	3.56519	4.84834	3.73529	4,43160	4.35022
16 8504	8.23480	6.03013	7.18150	6.48161	6.65117	8.26803	8.04319
17 BbD4	7.22704	6.15596	6.07125	5.98734	6.36209	7.13931	6.88233
			C 4 C 4 D 4	2. 63169	3.25137	3.89605	4,14065
18 8704	3.98989	4.69352	5,16601				
18 8704 20 SCIL TYP 19 CFOP TYP	3.93989 0.63145	0.47871	0.50195	G. 64051	0.53452	0.56738	0.58477

" STEP NUMBER """

VARIABLE	F TO FORCE REMOVE LEVEL	*	VARIABLE		FORCE LEVEL	TOUERANCE
	F= 4 649	*	D	F= 4 548		
	•	*	3 B4D1	17.679	1	1.009530
		*	4 B501	18.977	1	1.000000
		#	5 B601	17.177	1	1.000000
· · · · · · · · · · · · · · · · · · ·		*	6 B7J1	16.179	1	1.000000
		*	7 B402	8.499	1	1.000800
	,	*	8 8502	11.872	1	1.000000
		¥	9 B6D2	37.123	1	1.0000000
		*	10 3762	40.993	<u> </u>	f.306036
		*	11 8453	26.494	1	1.090608
		*	12 5563	28.755	1	1.000000
		#	13 8603	10.360	1	1.000066
		+	14"8703	17.564	1	1.360000
		*	15 84C4	93.005	1	1.000000
		*	16 B564	116.159	1	
		*	17 B604	22.129	1	1.000006
		*	18 8754	77.977	1	2.000000
		*	20 SOIL TYP	3.423	1	1.000000

								,	
_ VARIABLE_		FORCE		VARIABLE	F		ORGE	TOLERA	NGE
	REMOVE					ڍُڳ [*] آ	EVEL		
·**eco	OF=4643		<u> </u>	7.7.7.4		642		~~d^ %	75 3
4 850±	9.520	1	*	3 B4u1		744	1	0.569 0.061	
6_8701 10_8702	5.831 8.757	1 1		5 8661 7 8432		316_ 305	1	<u>3.081</u>	
10 6702 12 6503	22.267	1	*	8 85D2		303 568	1	0.714	
16 6504	42.059	<u> </u>	*.	9 8602		996-	- i	3.156	
18 B7D4	64.975	1	*	11 8453		474	1	0.979	
	076363		*	13 8603		719	- -	0.463	
			*	14 8733		531	1	0.602	
- · · · · · · · · · · · · · · · · · · ·			+	15 8404		59 E	1	0.091	
			*	17 8604		43 E	1	0.085	
			*	20 SOIL TY	P 2.	591	1	0.853	113
F - MATRIX	D'EGRE	ES OF	FREEDOM	= 6 643					
·	WINTHH (ES OF	FREEDOM :	= 6 643 Sumfal	NON AG				
GRASS	#INTHH (RASS							
GRASS	WINTHH (4.03 141.11 19	RASS	CORN						
GRASS COEN SÚMFAL	WINTWH (4.03 141.11 19.	70 40	CORN 72.31	SUMFAL					
GRASS COEN SUMFAL NON AG	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1.	70 40 73	72.31 14.32	SUMFAL 0.42	NON AG				
GRASS COEN SÜMFÄL NON AG GRASOR	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4.	70 40 73	CORN 72.31	SUMFAL 0.42					
GRASS COEN SUMFAL NON AG GRASOR	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1.	70 40 73	72.31 14.32	SUMFAL 0.42	NON AG				
GRASS CORN SUMFAL NON AG GRASOR CLÁSSIFICAT	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4.	70 40 73 47	72.31 14.32	SUMFAL 0.42	NON AG	SUFF7	al o	SEN SO	RG
GRASS CORN SUMFAL NON AG GRASOR CLÁSSIFICAT	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4.	70 40 73 47	CORN 72.31 14.32 126.50	SUMFAL 0.42 5.00	NON AG	SUFF7	al o	GRASO	
GRASS CORN SUMFAL NON AG GRASOR CLÁSSIFICAT	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4.	70 40 73 47	CORN 72.31 14.32 126.50	SUMFAL 0.42 5.00 CORN 0.164	NON AG	a. 77	113	GRASO 0.010	79
GRASS COEN SUMFAL NON AG GRASOR CLÁSSÍFICAT	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4. ION FUNCTIONS OUP = WINTWH 0.849 0.2666	70 40 73 47 5	CORN 72.31 14.32 126.50 GRASS -0.05558 0.41846	SUMFAL 0.42 5.00 CORN 0.164 0.057	NON AG	0. C77	113 151	GRASO 0.012 0.189	79
GRASS COEN SUMFAL NON AG GRASOR CLÁSSÍFICAT GRO VARIABLE 4 B501 6 B701 10 B702	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4. ION FUNCTIONS OUP = WINTWH 0.849 0.2666 0.708	70 40 73 47 5	CORN 72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674	SUMFAL 0.42 5.00 CORN 0.164 0.057 0.455	NON AG 6.97 98 - 95	0. 27 0. 20 0. 62	113 951 530	GRASO 0-189 0-661	79 118 .73
GRASS COEN SUMFAL NON AG GRASOR CLÁSSÍFICAT GROVARIABLE 4 B501 6 B701 10 B702 12 B503	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4. ION FUNCTIONS OUP = WINTWH 0.849 0.2666 0.708 0.326	70 40 73 47 5 47 77 22 36 35	CORN 72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838	SUMFAL 0.42 5.00 CORN 0.164 0.057 0.455 0.267	NON AG 6.97 98 - 95 17 41	0. (7) 0. 209 0. 626 0. 363	113 951 630 294	GRASO 0.012 0.189 0.661 0.407	79 118 73
GRASS COEN SUMFAL NON AG GRASOR CLÁSSÍFICAT GRO VARIABLE 4 B501 6 B701 10 B702 12 B503 16 B504	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4. IION FUNCTIONS OUP = WINTWH 0.849 0.266 0.708 0.326 0.411	70 40 73 47 6 77 22 36 35	CORN 72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838 0.29889	SUMFAL 0.42 5.00 CORN 0.164 0.057 0.455 0.267 0.134	NON AG 6.97 98 95 17 41 34	0. (7) 0. 209 0. 626 0. 363	113 951 980 294	GRASO 0.010 0.189 0.661 0.407	79 18 73 734
GRASS COEN SUMFAL NON AG GRASOR CLÁSSÍFICAT GROVARIABLE 4 B501 6 B701 10 B702 12 B503	WINTWH (4.03 141.11 19. 6.80 4. 1.51 1. 22.82 4. ION FUNCTIONS OUP = WINTWH 0.849 0.2666 0.708 0.326	70 40 73 47 6 77 22 36 35	CORN 72.31 14.32 126.50 GRASS -0.05558 0.41846 0.74674 0.25838	SUMFAL 0.42 5.00 CORN 0.164 0.057 0.455 0.267	NON AG 6.97 98 95 17 41 34	0. (7) 0. 209 0. 626 0. 363	113 951 980 294	GRASO 0.012 0.189 0.661 0.407	79 18 73 734

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

GROUP	PERCENT CORRECT	LIBEANY	OF CASES	CLASSIFI	ED INTO G	₹00F -
		Winth	ET GRASS	CORN	SUHFALT	orolland —
WINTHHET	63.7	151	1	11	Q	74
GRASS T	3.	9	0	2	<u> </u>	6
CORN	79.6	12	0	95	Q.	12
SUHFATO	Ú.	.21	8	1	C	30
NON AGR	0.	. 2	۵	0	Q	5
" GRASORG'"	70.7	61	C	6	G	162
TOTAL						
JACKRNIFE	· · ·		1	115	0	289
		TCATION	TOF CASES			
JACKRNIFE	O CLASSIF	TCATION NUPBE	-			70UP =
JACKRNIFE	O CLASSIF	TCATION NUPBE	OF CASES	CLASSIFI	ED INTO GR	70UP =
JACKKNIFE GROUP	D CLASSIF PERCENT CORRECT	TCATION NUPBES	OF CASES	CLASSIFI	ED INTO GI	ROUP =
JACKRNIFE GROUP WINTWHET	D CLASSIF PERCENT CORRECT 62.9	NUPBES WINTWE	OF CASES	CCASSIFII CORN 11	ED INTO GR	70UP = 0 GRANGRG
JACKRNIFE GROUP WINTWHET GRASS	D CLASSIF PERCENT CORRECT 62.9	NUPBES WINTWE	F OF CASES HET GFASS	CLASSIFIA CORN 11 2	SURFACO	75 6
JACKRNIFE GROUP WINTWHET GRASS CORN	D CLASSIF PERCENT CORRECT 62.9 0. 79.8	NUMBER WINTWE	F OF CASES HET GFASS 1 0 0	CLASSIFIA CORN 11 2	SUMFALO 1 0 0	75 6 12 30 5
JACKKNIFE GROUP WINTWHET GRASS CORN SUMFALO	D CLASSIF PERCENT CORRECT 62.9 0. 79.8	NUPBER 149 8 12 21	FOF CASES HET GFASS 1 0 0	CLASSIFII CORN 11 2 95	SURFACO	ROUP = 0 GRANGE G

			-	~			
SU	м	м я	=	•	TΑ	_ O.	
30							

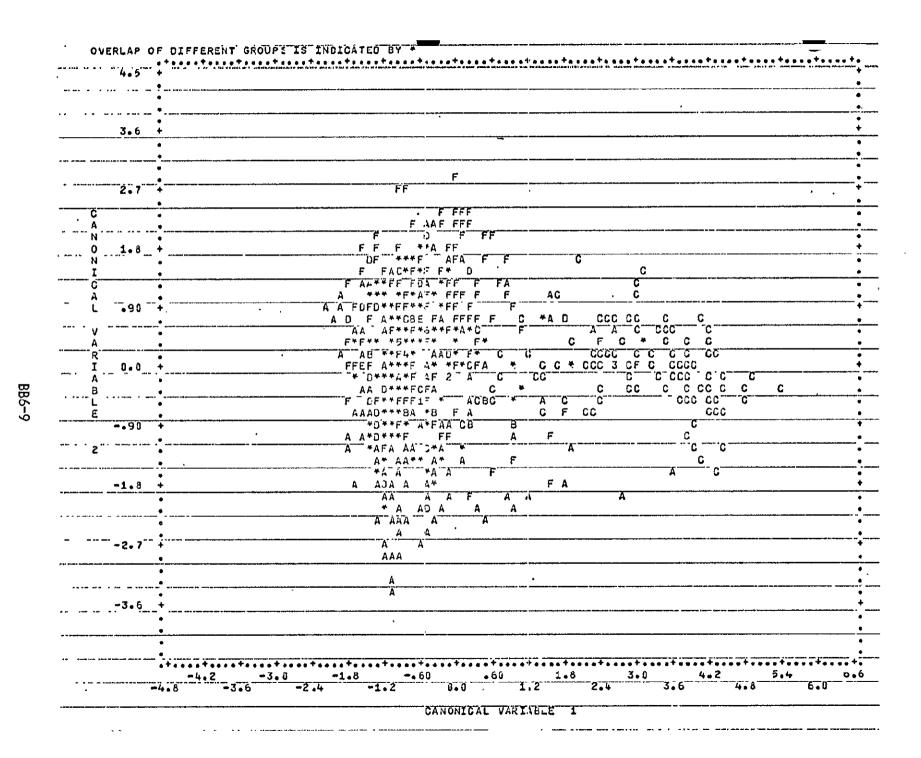
STEF	VAR	TABLE	F VALUE TO	A DWREY OF	U-STATISTIC	TAPPKOXIMATE
NUHEER	ENTERED	REMOVED	ENTER OR REMOVE	VARIABLES INCLUDED		F-STATISTIC
1	16 8504		116.1591	1	0.5824	116-159
2	18 8704	_	64.5442	2	0.4153	88.946
3	12 8503		25.8983	3	0.3588	67.413
4	4 B5D1		9.8387	4	0.3381	52.492
5	10 B702		9. 4544	5	0.3194	43.889
6	6 B7D1		5.8310	6	0.3082	37.527

Percentage of Variation Between Groups Explained

Eigenvalues	1.52504	0.21103	0.03195	0.02824
Percentage	84.90	11.75	1.78	1.57
Canonical Correla	ations			
	0.77715	0.41744	0.17596	0.16573

VARIABLE	COEFFICIEN	TS FOR CANON	ICAL VARIABL	ES
4 E5C1	0.04604	-8.84759	-0.12397	-0.10169
6 B701	-0.05456	-0.06878	-0.03452	0.19635
10 8702_	-0.0708ŭ	-0.03910	~0.10850	0.08512
12 B503	-0.02392	0.08052	-0.03893	-0.07313
16 8504	-0.08278	-0.63467	8.18160	-0.05339
18 8704	0.17102	-0.06715	6.07180	-0.09674
CONSTANT	1.37220	3.14749	1.53011	4 • 47417
GROUP	CANONICAL VAR	IABLES EVALU	AYED AT GROU	P HEANS
WINTWHET	-0.65664	-0.53291	-0.34744	-0.04085
GRASS	-0.10481	-0.17709	-0.02529	1.05067
CORN	2.60383	-0.04903	0.02476	-0.02252
SUMFALO	-0.83325	0.19772	0.59098	-0.11134
NON AGR	-0.94528	0.30912	0.40115	0.20100
GRASORG	-0.47697	0.54448	-0.09620	-0.01743

GROUP	Mean Coordin	ates	Symbol for Cases	Symbol For Mean
Winter wheat	-0.66	-0.53	Α	1
Grass	-0.10	-0.18	В	2
Cern	2.60	-0.05	С	3
Summer Fallow	-0.83	0.20	D	.4
Non-agriculture	-0.95	0.31	E	5
Grain sorghum	-0.48	0.54	F	6



OVERLAP OF DIFFERENT GROUPS IS INDICATED BY

BB6-10

APPENDIX BB7

Discriminant Analysis of RICE County Using Combined Classification Variable Incorporationg Both Soil and Crop Types (Linear contrasts separated crop categories only)

Transformation of Original Variables

1	SUBROUTINE TRANSF(Y, KASE, NPROB, USE)	
5	COMMON/GETCMB/FAD(17), AMIS	
3	OIMENSION X(1)	
· 4	IF((X(22).LT.1.1).ATE.(X(20).GT.2.9)) X(21) = X(19)
5	$IF((X(20),LT,2.1),AND,(X(23),GT,1.9)) \times (21) = X$	
5	[IF((X(20),L),3,1),ANC,(X(20),G),2,9)) X(21) = X(21)	19) 417
7	FETUPN	
8	. GN3	
U		

```
BHDF7H - STEFMISH DISCHIMANT ANALYSIS. HEALTH SCIENCIS COMPUTING FACILITY
         UNIVERSITY OF CALIFORNIA. LOS ANGELES
         IN THIS VERSION OF BHOFFY
-- GROUP COCES OR CUTPCINTS MUST BE STATED.
              PROGRAM CONTROL INFORMATION
         PROBLEM
                     TITLE = 'RICE CO SAMPLE 1 RAW DATA WITH SOIL CONTRAST'./
       INPUT
                     VAPIA 5.E = 27.
                     FGRMAT = "(245.12F5.0/EF5.0)".
                     LASE = 6:0.
                   UI IT = 12.
                        GFCUP = 15.7
         VATIAE ADD = 1.
                          NAME = ".ON". "CCLUMN", "E401", "B501", "Bc21", "B701", "B+22",
"E502", "E602", "B702", "B403", "B503", "B603", "B703", "8404", "3504",
"E004", "E704", "CFUP TYP", "SOIL TYP", "CFCP&SOL".
                  USE = 3.4.5.6.7.8.3.13.11.12.13.14.15.16.17.18.
                  LAEFL = 1,2.
                  GROUP = "CFCPESOL"./
         GPOUP
                 SODE = 1,4,5,9,15,11,12,13,16,17,16,19,20,21,24.

NAME = WINTHETT, SUMFACOT, GRANSCRI, WINTHETZ, GRASSZ, CORNZ,
                                    SUMFALCE, MOHAGE, GRANS (RE, WINT WHT3, GRASS3, CORN3,
                                    SUMFALCS, TORAGE, GKANSOFT.
                  USE = 1.2.3.4.5.6.7.9.16.11.12.13.15./
         3V42
                 Unii = 10.
COSS = "RICL CO"
         LEEFL = "FICE CO SAMP 1 WITH CONTRAST VARIABLE"./
         CLASS = 1,2,3,4,5,6,7,8,9,1E,11,12,13,14,15./
FLOT (ALONIC2L./
         DISC-INIMANT METHOD = 2.
                         FCFCE = C.
                         STEF = 47.
                  \frac{\text{CCNTR}_{\ell} \text{ST}}{\text{CONTR}_{\ell} \text{ST}} = \frac{-1}{1}, \frac{-1}{-1}, \frac{-1}{-1}, \frac{-1}{1}, \frac{-1}{1}, \frac{-1}{-1}, \frac{-1}{1}, \frac{-1}, \frac{-1}{1}, \frac{-1}{1}, \frac{-1}{1}, \frac{-1}{1}, \frac{-1}{1}, \frac{-1}{1}, 
                  CGATFAST = -1,-1,-1,-1,-1,13,-1,-1,-1,-1,-1,2,+1,-1,+1
                  GGh.TolST = +1,-1,-1,-1,-1,C,+1,-1,-1,-1,+1.13,+1,-1,-1
                  JACK./
         END/
```

NUMBER OF VA HUMBER OF VAL TOTAL NUMBER NUMBER OF CA	FIABLES ADDEC OF VAFIABLES SES TO REAUTI	'THA'THA'ISF	OFMATIONS.	21	MANAGE OF STATES	a gara stage (dha mpetha ab	ifferentiatings just and the telefologous services are the telefologous services and the telefol	n, an deliving y Theody Section and American	e and the same of
CASE LABILING LIKITS AND P INPUT UNIT NO	issing value umher			. 12	COLUM	<u> </u>	,		•
้าปัจเก็ม ซักมัพ 3 ค	UNIT FRIOR T	O PEADING.	· DATA. •	. YES		•			
THPUT FORMAT 1245.	12F5.0/6F5.6)	, , , , , , , , , , , , , , , , , , ,		·····	· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·
									·
TVAPIABLES TO	RF USEO			•					
	3 3461.	4 35		5 9501	6	8701	7 84		
	6 45C2	9 96 14 97		10 6702 15 8404		B403 8504	12 E9	503 504	
***************************************	16. 8704	<u> </u>					44 60		
CC MANY CONTR		D •							
GLEVANCE		3.013							
- TO - F E MOVE	• • • • •	4.007 3.996					· · · · · · · · · · · · · · · · · · ·		
ETHOC	LEVEL	2 3 40	an was a sum of the same of th						· , , , , , , , , , , , , , , , , , , ,
FICE PEOFFEIF		0.07692	0.37692	0.076 92	C.37692	0.07692	0.07692	0.07692	0.0763
•		07672	~~ 27692~	0.77692	0.97692	0.07692	0.07692	0.07692	
		TRENSFORMA					RVAL RANGE		
VARIARES	MINIMUM	MAXIMUM 	MISSING_ Code	GATEGORY	CATEGORY NAME	GPFATE THAN		THAN	
•	221124	CINII.	0002				0, 0		
Si CEOPISOL				โ.ซอรีซิดี	WINT WHT				
هاست مدر بسده کالار و وجویون بدار الشاهاری بیمون بهرانی				4.00600 8.0000	SUFFALO: GRANSOP:		 		
				9.00000	WIN THE TA				
				าัก _• อีกรรได้	゚ヿ゚゚゚゚゙゙゙゙゙゙゙゙゙゙゚ゔ゚ヹ゚ゔ゚ヹ゚゚ゔ゚゚゚゚゚゚゚゚゚゚ゔ゚ヹ゚゚゚゚゚゚゚゚				*****
			·	11.00005	CORNZ				
		•		12.00000 13.00000	SUMFALO? NONAG2	2			•
······································			······································	15.00000	GRANSOR	,			
	•			17.00503	WINT WHT?		•		
				18.000330	GRASS.3				
				19.00000	CORN3			·	
				23.00000	SUMFALO	5			
**************************************				21.06566	RONAG3 GRANSOR:	3			
		· · · · · · · · · · · · · · · · · · ·	~						

CUNTS	126.	5.	ei.	28.	3.	80.	653.		
21 CHOPESOL	17.00000	10.0000	19.00000	26.000	21.00000	24.0000	15.25574		
18 5764	25 - 15 3 3 3	25.23319	31.36766	. 22. 89236	20,50000	23.75000	24.48651		
17 8604	51.20833	45.60000	53.55574	47.17857	41.33333	47.61250	48.10260	······································	-,
16 6504	44.39167	35.03010	24.30164	41.39236	37.00(69	38.46250	37.84380		
15 8494	33.76667	36.00020	30.44262	38.63714	34.66667	36.88750	36.57274		
14 6703	19.99167	19.87770	23.37377	10.85714	17.66667	23.36250	19.56371		
13 66[3	41.46687	40.87770	45.27869	78571	37. 56667	42.68750			
12 8563	35.16667	35.60136	20.95052	37.96.19	33.33333	37.77990	33.64319		
11 0463	34.1750	32.60790	31.50820	25.42857	33.33.33		37.58652		
9 8602 10 5702	27 • 7 0 5 4 2	26.23388	21.43607	24.20571	24.33333	24.85900	24.35069		
	51.27550	48.42003	43,47541	48. 357.4	45.55867	48.63750	45.65195		
7 9402 9 6602	34 • 51 ° 33 33 • 75 833	36.40010	30.48525	40.3213	31.00000	35.41250	36.41867		
6 2771	15.89167 34.5933	17.2901 <u>0</u> 36.2000	12.70492 36.42623	38.17857	31.704.09	36.65180	35.60337		
5 5601	31.15117	29.2770		13.642.16	12.33333	14.45000	13.51761		
4 55 F 1	25.84167	16.50000	21.16393 25.24590	19.75360	20.33333 24.56667	27.88750	26.57274		
3 8401	25.13333	21.00000	22.15746	22.714.19	23.65667	23.78720 21.38750	23.79939 21.8698*		
14141V			•				23.79939		
co oue =	- NINTERS	GPASS3	CCPN 3	SUAL VEGE	NONTAG3	GRENSOFT	TFS. US		
CUNTS	18.	4.	13.	99.	rı.	58.	20.	4.	
T CFCFESCE	1.02000	4.00000	0.00000	9.40000	19.09900	11.00000	12.00000	13.00070	16.
14 6704	22.72222	18.00000	21.92318	12.65666	21.72727	29.44328	27.85600	23.03699	2?.
7 ELO4-	- 42.72722	35.50000	47.15385	16.89859	44. 300 00	51.18965	48.55000	47:50005	44.
16 8504	39.05556	29.50000	45.69231	43.59556	35.45455	24.34483	46.80000	44.50000	36.
5 8404	77.55556	31.00000	41.53846	29.43434	35:19091	30.10345	41735000	39.51000	~~ 35.
14 0703	18. [7] 7]	22.51310	18.00000	17.02320	21.53536	21.34483	16.60000	19.50100	20.
13 9673	37.5000	42.75016	37. 17592	35.73758	42.181.62	41.30655	34.4666	41-62560	42
12 PEC3	23.45667	32.51000	32.07692	30.40404	27.30364	24.37931	37.20000	34,75000	38.
10 6702 11 6453	- 24.00000	16.2500 <u>0</u> - 32.25010	33.61538	31.54545	21.54545	70.72414	31.40000	34.0950c	35.
9 8602	"44.83₹₹ <u>"</u>	31.7500	~~~ 49.37692 ~~ ` 25.46154	48.13131	24.03091	19.79310	26.45000	27.25000	23.
8 B5 C7	31.00,000	27.25000	35.00000	34.46435	34,36364 44161818	33.67241 37.15517	31.95053 49.15830		46.
7 1:402	32.61111	31.00000	35.76923	35. 15152	34. 36354	32.41379	37.55000	34,750000 34,75350	37. 39.
6 H7C1	12.22.22	12.25000	10.32708	13.49899	13.18162	10.16897	11.75000	11,5,300	13.
' 5 HEC1	55.64444	~~~24.75003~~	23.00000	27.85859	24.45455	21-10345	23.35000	21,25030	25.
4 95 01	17.65889	16.75000	86.06999	24. 46465	21.45455	19.25462	19,35000	17,50000	12.
3 P4C1 """"	21.05556	~~~?3.75000~~~	22.69731	2 56 55 56	23. 53535	22.06897	22.50000	20,25000	22.
APIAPLI							•		

BB7-4

STANDARD DEVIATIONS	5.1	ſΔt	an a	¢D.	DEL	1 T A	T T	OUS
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	THANKING T	SUMFALO1	GRANSOP1	ः स्मारम् स्ट्र	G91 357	CO% NS	SUMFALOS	NOHAGE	Ge A V
APIABLE									
3 8401	~ P 3 8 8 3 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	7.89297	2.17503	7 3523	4. duset	2: 91916	7.79179	1:53000	3.4/
4 2501	4. 63772	2: 05155	3.67.423	6.5719.	6.25082	4.19089	3.20321	3,69685	5.3
5 2fC1	7.53388	3, 2,156	3.16228	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	5. EA: 77	5.11513	3.24869	0.95743	6.7
6 B7C1	2.25357	1.50000	2.13937	3.33655	3.70994	3.42776	1.91630	1.29239	4,1
7 6462	3.48739	1.41421	3.46780	3.9210.	2.50791	3.07243	3.79022	7.04746	T, 5
8 84 [2	6.07793	1.51000	6.65833	7.57455	5.12392	4.85804	7.44435	13.22561	8.0
9 6608		3.5!100	2.97364	(7.2997.	7.91112	6.84618	3.37610	4. 24264	6.7
19 6702	6.58176	4.03113	3.97179	4. 53599	5.23489	3.88320	3.11997	6.44951	.4 - 3
11 0403	3. 62679	2.87228	3.75363	(6275 J	2.97871	2.63074	4.27231	6:16441	.5.2
12 81 [3	4.68232	5.89230	6.43503	7.8479.	4.96533	4.83346	7.07553	8.39153	3.7
13 8603	5. F1327	5.37742	5.493+2	.7.19124	8. 11122	7.35315	5.39395	6.97615	9.2
14 8703	3.37813	3.87298	3.41565	3. 64384	4.92469	4.48605	2,43656	3.69685	5.3
15 8404	6.50:88	4.00000	3.79946	4.5673?	3.56584	3.76249	4.00132	3.31662	4.3
16 (15 (4	10.94187	7.72442	7.09912	8. 28685	5.28273	7.08978	6.67754	7.10795	8.2
17 0604	6.53322	5.25991	5.71323	6.67082	6.37181	7.17+68	5.30615	3. 31662	7.3
18 8774	3.19168	4.54676	2.56450	3.37705	4.33799	5.92104	1.92696	1.41421	4.1
21 CFGFLSCL	n,	Ĉ.	ĉ.	ů:	ę.	9.	0.	0.	5.
GPOUP"="	า เพิ่มใจ เพษาร	GRASS 3	CGFN3	SUMFALOS	NOVILG3	GRANSOR3	GPS. US		
3 P4[1	- 5.21139	2.23697	3.97843	2.6785+	3.05505	3.47757	3.99436		
4 9561	9.12309	3.23936	€.29333	4.88593	2. 18167	5.72+58	6.09158		
5 8601	7.75665	7.08520	7.88174	4.5127	6.50541	5.62486	6.45284		
6 E7E1	3.88913	3.63318	4.84195	2.85723	4.50925	3.05477	3.67242		
7 8402	4.67172	2.77489	F.727+3	4.22561	2.64575	4.71222	4.27745		
A 6502	8. 44987	5.17657	7.83933	7.35373	4.58253	8.81541	7.98439	my Hard .	
9 8602	4. \$6706	4.21910	8.49236	4. 25 32 3	2. 18167	6.26967	6.35491	hd fei	
10 8752	3.50346	2.69328	4.32890	2.97965	3.21455	3.50904	4.13774	資料	
11 8423	4.62748	2.17364	3.25653	5.39941	5.45947	5.03+43	4.78249	트란	
12 8553	9.66745	7.89739	7.22363	9. 2143 3	9.45163	10.74795	8.50270	REPRODI ORIGINA	
13 5603	9.27269	2.54939	5.18051	3. 63537	7.37111	8.27317	7.81996	Fig	
14 0703	4.67 775	1.30394	2.98585	4.50273	3.51188	3.74248	4.32444	는 거	
15 8404	4.16726	3.16228	3.45217	4.21935	2.35943	4.20364	4.23922	− ਚੁੱ∷	
16 6667	7.55517	6.12372	7.31598	7.60763	2.64575	7.64902	7.82192	AL PA	
17 6FE4	7.13520	5.6:315	4.68230	4.84813	8.53490	6.42265	6.63485		
18 8704	4.16063	5.01996	4.16746	2.64351	4.58258	3.35457	4.01292	田田	
ZI"CFCPKSOU"						0.	B •	<u>්</u> ත්	
E1 0, 5, 1015	• •	* •	~ •	••		••	• •		
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								71HI 300,	

VARIFBLE	F TO FORCE	+	VARIABLE	F TJ F	UKCE	TOLERANC
	REMOVE LEVEL	∓		ENTER L	EVEL	
	CF= 13 641	¥		OF= 13 540		
		#	3 8461	8.229	1	1.03909
		*	4 8501	8.936	1	1.00000
		¥	5 85.1	10.174	1	1.00000
		*	6 3761	10.177	1	1.10(4)
	•	Ŧ	7 6402	€.037	1	1.80000
		+	\$ B5C2	6.058	1	1.33007
		*	9 5602	18.457	1	1.96000
		¥	10 E702	17.435	1	1.7000
		*	11 B403	8 • 25 3	1	1.00003
		*	12 6563 •	11.129	1	1.00000
		*	13 8633	5.931	1	1.09003
		*	14 B703	5.401	1	1.00000
		*	15 B494	24.493	1	1.30000
		*	16 f.564	29.343	1	1.50353
		¥	17 B6L4	8.953	1	1.300000
		*	18 8704	15.934	1	1.30013

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STEF	TATTA	A E L E F E M O V E D	F VACUE TO ENTER OR REMOVE	NU PER OF VARIABLES INCLUDED	U-STATISTIC	ZFFFOXIMATE F-STATISTIC
•	16 BED4	75.110120	29.3433 15.2340	1	0.6266 9.4753	29.343
_	18 0704 12 A503		19.6962	4	0.3927 0.3533	17.986 14.636
<u> </u>	9 EFC2 4 H501		5.0386 4.0284	- 5 5	0.3205 0.2960	12.607 11.108
<u> </u>	6 0731		7,000			

# Percent of Variation Between Groups Explained

Eigenvalues	1.55352	0.29939	0.19371	0.06496	0.04932	0.02404
Percentage	71.101	13.702	8.866	2.973	2.257	1.100
Canonical C	orrelations					
	0.77999	0.48001	0.40283	0.24698	0.21681	0.15321

VARIAELE	COFFFICIENTS	FOF CANONIC	AL VARIABLES	<u> </u>	<del></del>	
4 9501	-2.54438	-6.33932	0.93339	9.18353	0.12332	-0.14523
6 B7C1	0.0-449	-0.0°033	-0.09839	-0.93445	-0.18577	-0.98143
9 66 <u>CS</u>	2.34442	-6.34496	-3.06750	-5.C4134	-2.77353	G. 06134
12 3663	0.02121	0.0F655	-3.37139	0.01957	5.02514	0.83146
16 85C4	3.39.84	-0.33333	3.36348	-0.54941	- C. CC 293	C. P4 674
19 3704	-9.16933	-0.12219	-0.03565	-0.10295	-0.12331	0.10999
CCNSTALT	-1.9:868	6.39693	5.33523	2.17039	5,49220	-3.86476
GROUP C	CANONIGAL VAR	IAELĖS EVALU	ATED AT GPOU	P.MEANS		
พังภัพิพิทิ	J-41719	C+33423	9.68910	-CV-4-34-81	0.57965	0.36154
SUMFALO1	-0.24329	1.98730	A.33441	0.79810	1.53236	-1.17175
GCANGOF1	1.15.2	0.14735	3.77772	-3.49278	0.36733	1.69763
MINIMHIS	9.71363	-6.33331	0.53479	0.24937	9.29322	-0.27526
GRESSZ	<u> </u>	C.13739	3.57254	2.30034	6.34474	-2.46134
C0FH2	-2.64512	0.24895	0.51089	0.05000	0.25230	-0.02237
SUPFALC2	1.11767	-0.17ES5	3.85916	-5.72535	C. 7.3471	2.79391
NCNAG2	1.15397	0.17221	3.23008	-1.94228	-0.25375	1.19636
GF LHS OF 2	3+41777	1.73624	-1.25435	0.11459	0.30136	-5.63436
WINTHHT3	1.64433	-2.75758	-0.25136	0.09242	-0.33978	-0.12231
68253	Q. C 570A	-6.24234	-0.56548	-1.12554	-1.54517	¢.49994
COEM3	-2.53312	-0.42837	-5.38575	-0.12001	-0.64533	0.18734
SUFFALCS	3.83513	0.32322	-0.15717	-0.37371	-0.(8627	6.38336
NCN4G3	0.59798	0.75859	0.32360	0.31090	0.67219	-0.28731
GF4NSDF3	0.44637	0.15577	-0.49825	-0.LS75E	-8.15677	C. £8127

### Points to be plotted

GROUP	Mean Coordinates		Symbol for Cases	Symbol for Mean
Winter wheat 1	0.42	0.36	Α	1
Summer fallow	-0.24	1.99	В	2
Grain sorghum 1	1.16	0.15	C	3
Winter wheat 2	0.71	-0.33	D	4
Grass 2	0.00	0.20	E	5
Corn 2	-2.65	0.25	F	6
Summer fallow 2.	1.11	-0.18	G	7
Non-agriculture 2	1.15	0.17	Н	8
Grain sorghum 2	0.42	0.74	I	9
Winter wheat 3	0.84	-0.76	J	Ó
Grass 3	0.06	-0.24	K	1
Corn 3	-2.53	-0.43	L	2
Summer fallow	0.84	0.33	M	3
Non-agriculture 3	0.60	0.77	M	4
Grain sorghum 3	0.45	0.16	0	5

BB7-12

2 1 . 8 + 2 2 1 . 8 + 7 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
1.6 +	
2	
2	
2	,
2.7 +	
•	-
3.t +	
3:6-+	

#### APPENDIX C

Morton County LACIE Intensive Study Site

Computer compatible tape coordinates

FR 160

LR 359

FC 270

LC 469

20 Bands of ERTS data from 5 dates:

October 23, 1973

May 9, 1974

May 27, 1974

June 14, 1974

July 2, 1974

ERTS observations ID's:

1457-16551 [reference scene]

1655-16512

1673-16505

1691-16501

1709-16494

Rotation and distortion parameters for ground truth bands to overlay ERTS bands.

+ 15.7° Rotation

Vertical Stretch .116 pel/pel at upper left

Horizontal Stretch .05714 pel/pel at upper left

Soil types taken from map of Morton County reconnaissance soil conservation survey from Soil Conservation Service, Washington, D. C. 1947.

Crop types were identified from landuse data collected by ASCS, June, 1974, prepared by FSO, Cartographic Laboratory Earth Observation Division, S & AD JSC/NASA, Houston, Texas, September, 1974.

#### APPENDIX CC1

# Discrimination Analysis for MORTON Using Raw Data

AUDURA AT BURA AAR AAR AAR AAR AAR AAR AAR AAR AAR
BHDP7M - STEPWISE DISCRIMINANT ANALYSIS. HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA; LOS ASGELFS
IN THIS VERSION OF PHOPTH
GROUP CODES OR CUTPOINTS MUST BE STATED:
PROGRAM CONTROL INFORMATION
PROBLEM TITLE IS
THORTON CO. SAMPLE 1 DISCRIMINANT ANALYSIS!
INPUT VARIABLES APE 24.
FORMAT IS 1(2A5,12F5,0/10F5,0)1; CASES ARE 2103.
UNIT IS 12.
/ · · · · · · · · · · · · · · · · · · ·
YARIABLE NAMES ARE POUS, COLUMNS, 84D1, 85D1, 84D1, 87D1, 84D2,
8502.8602,8702,8403,8503,3603,8703,8404,8504,8604,
8774.8405.9505,8405,8705, CROP TYPI, ISOIL TYPI.
HSE = 3 TO 24.
LATEL=1,2. GROUP=:CROP TYP:
GROUP CODE IS 1 TO 6,8,9;
NAME WINTWHET, GRASS, CORN, SUMFALO, INON AGRI, WATER, GRASORG,
RYE,
PRINT STEP, CLASS=1 TO 15.
PLOT CANON, GROUPS ARE 1 TO 6,8,9,
rROUP=1,2,3,4,8,9,
ALGORIUS VICTURE IS AL SANGE A DEED AND
DISCRIMINANT METHOD IS 2: FORCE =0, STEP=40;  JACKKNIFE,
hydrantis.
END/
TO ARREST OF WAY, B. T. T. T. T. T. C. ARWAN, ARE INCOME. A REPRESENTANTION CONT.
PROBLEM TITLE :
NUMBER OF VARIABLES TO READ IN: 24
NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS, . 0
TOTAL NUMBER OF VARIABLES
- NUMBER OF CASES TO FEAD IN
CASE LABELING VARIATLES : RORS COLUMNS
LIMITS AND AISSING VALUE CHECKED BEFORE TRANSFORMATIONS INPUT UNIT NUMBER
REWIND INPUT UNIT PRICE TO READING . DATA . YES
CONTRACTOR OF THE PROPERTY OF
INPUT FORHAT
(2A5,12F5,0/10F5,0)

VARIABLES	TO SE USED 3 84D1	. 4 95D1		5 86D1	6	87D1		402	
a •	ลิ คริงวิ	9 Bél2		10 6702	1.1	6403	12 9	sc3	
	4.7 5.6h7	14 5703		15 6404	16_	8504	B	34D4	
44 M f 1 1 m m 1	18 87D4	19' P4D5		20 B5D5	2:	8605	22 B	3705	
	23 CROP TYP	24 _ SGIL	TYP						
							<del></del>	<del>_</del>	
TOLFRANCE	<u> </u>	0,010							<del></del>
1 TO BENDAGE 1		.4,000							
F-TO-REPOYE,	First of Continue	3,996		-					
METROD	En LEVEL :	'n							
MAYTMEN NUMP	ER OF STEPS.								-
	ILITIES.		0112500	0.12500	0.18500	0,12500	0112500	0,12500	0:1250
التقافية الكار الشام الألام الاستناسيسية المستناط									
		TRANSFORMATIC					ERVAL RANGE	<u> </u>	
VARIABLE	MUNITHIM		WISSING	CATEGORY		GREATE	ER LESS	S THAN	
NO. NAME	LIMIT	LIMIT C	CODE	cope	NAME	THAN	OR_P	FQUAL TO	
23 CROP TY				1,05000	WINTWHET	T			
<u> </u>	<u> </u>	<del></del>		5.00000		<del></del>	<del></del>		
				3,00000					
				4.00000					
				5,00000	NON AGR				
		<del></del>		6,02000	TTV/TERT				
				8,00000	GFASORG				
<del></del>				9.00000	RIE				****
	· # :'%\.'''''''	<del>,</del>							
NUMBER OF A	CASES READ			2103					
							,		
	,			,					
		<del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>					<del></del>		

VARIABLE	ENTERED	<u>8 F51</u>	72			· · · · · · · · · · · · · · · · · · ·		
VARIAE	LE	FTC	FORCE	*	VARIABLE		F TO FOR	E TOLERANCE
•		ELCAE		ă ·			NITER LEVE	£ <b>L</b> ,
	DF=	7,2040	)				<u>7 2079                                     </u>	
3 P40	1 1	1.112	1	4	5 B6D1		0,425 1	0.497941
4 850		<u>8,255</u>	1	<b>*</b>	10 B7D2		2:695 1	0.807300
6 B7E	11 3	11.037	1	₩.	13 BAD3		3,859 1	6,122134
7 B4E	2	7,103.	1	<b>P</b>	18 E7D4		2,483 1	0,163184
8 95I		4,092	1	Q.	19 B4D5		3,967 1	0.109117
9	12 2	0.433	1					
11 641	13	3.697	1	Ş.				
12 851		6,000	1	•				
14 670	3 1	1,196	1	4		•		
15 640		5.906	1	đ				
16 B51	4	0,804	1	*				
17 840	4	6,517	1	<b>#</b>				_
20 851	:5	2,114	1	¢				
21 840		0 881	1	帮				
22 E7		3,142	1	₩		·		
24 501	L TYP 6	0.205	1	Ď.		· <b></b>		
U-STATIS	TIC OR WIL	KS! L	AHBDA	_0,0802	244 DE	GREES OF	FREEDOM	16 7 2095
	ATE F+STAT			57,			FREEDOM	112.00 13457.4
F + MA1	RIX	กะดอย	ES OF	FREEDOH	= 16 20	€0		territorio de Poperio de desta e e estado
	WINT	IWH (	GRASS	CORN	SUMFAL	NON A	S WATER	GRASOR
GPASS_	143,62							
CORN	172:21		.08					
SUMFAL	228,77		73	94.07				
MON AC			.25	3.35	1.75			:
WATER	2,43	2_	80	2,10	1,76	1,71		
GRASOF	67,71		48	11,46	24.55	2.51	1+31	
RYE	35,31	33	65	45,93	29,33	6.11	3,43	30.23

- •	QUP =	WINT PHET	GRASS		CORN	SUMFALC	N	ON AGR	WATER	GRA SORG	ŔŸÉ
ARTABLE 3 8401		4. 56522	4.5659	.a	4.41576	4.98555		. 64743	4.53324	4.52607	5.01327
4 B501		-2.90496	-2.7785	-	-2.81515	-3.09611	_	.99201	-3.07162	-2.96715	-2.97827
6 8701		9.64618	0.4093		0.81313	0.39761		41777	1.01370	0.95695	0.49024
7 B4C2		4.12007	4.5485	_	4.26815	4.2531		75739	4.98595	4.30315	3.74789
8 8502	·	-2.79869	-2.6766		2.69814	-2.68451		. 73254	-3.59240	-2.80293	-2.47855
9 8602		1.32179	0.9933		0.89564	1. 12 0 57	_	.86275	1.42666	9.93985	1.37840
11 8403		2.91791	3.4541		3.32297	3. 22371		. 77 421	3.63?96	3.56918	3.14322
12 8503		-2.22740	-2.5600		-2.07161	-2.14004		• 59979	-1.72144	+2.15865	-2.11831
14 E7C3	******	3.67774	3.1973		3.12809	3. 25729		. 286.98	2.05519	3.13269	3.59373
15 9404		2.38104	2.6620		2.34799	2.32699		.23181	2.27076	2.23590	2.15071
16 B5C4	·	-1.51871	-1.7689		1.43679	-1.47337		- 56143	-1.72579	-1.45796	-1.42449
17 8604		0.57124	0.4915		0.46958	0.58838	i Ö	.71200	0.71175	0.69184	0.45033
20 B505		0.30464	0.1579		-0.206C2 T	0.37236		.17851	0.39634	0.10737	0.34757
21 8605		0.51435	0.5719		[.54498	0.27250		.45n81	0.28271	0.41968	0.35121
22 B7D5		-3.43367	-0.4839		0.04628	-0.25512		.37783	0.18637	-0.10642	-0.38941
24 SOIL T	ΥP	16.77801	19.1079		L7.08736	17.2029(		.66911	16.21811	17.74537	24.64211
	PERCENT CORRECT			LASSIF:	ED INTO GO		hater	GRASCRG	RYE		<del></del>
hINTWHET	CORRECT		OF CASES C T GRASS 12 147		***************************************	23 37	%ATER 9 0	GRASCRG 9 2 '	RYE 20 7		
LINTWHET GPASS	ÖORREÖ1 * 84.4 * 70.7	WINTWHE 707 6 7 30	T GRASS	CORN	SUMFALC 55 6	NCN AGR		9 2 46 73	20 7 1 26		
HINTHHET GPASS COPN SUMFALO	ÖORREČ1 84.4 70.7 60.4	WINTWPE 707 6	T GRASS12 1475	_ CORN3 3 116	SUMFAL( 55 6 9 534	23 23 37 4 39	9	9 2 ' 46	20 7 1 26		
FINTHPET GPASS COPN SUMFALO NON AGR WATER	84.4 70.7 60.4 72.5 80.0	WINTWHE 707 6 7 30	T GRASS12	_ CORN3 3 116	SUMFAL( 55 6 9 534	23 37 4 39 4	9 0 4 16 0 2	9 2 ' 46 73 6	20 7 1 26 0		
LINTHHET GPASS COPN SUMFALO NON AGR	84.4 70.7 60.4 72.5 80.0	WINTWHE 707 6 7 30	T GRASS12	_ CORN3 3 116	SUMFALC 55 6 9 534 0	23 23 37 4 39	9 0 4 16	9 2 ' 46 73 5	20 7 1 26		
FINTHPET GPASS COPN SUMFALO NON AGR HATER GRASOFG	84.4 70.7 60.4 72.5 80.0	WINTWPE 707 6 7 30 0	T GRASS12	_ CORN3 3 116	SUMFAL( 55 6 9 534	23 37 4 39 4	9 0 4 16 0 2	9 2 ' 46 73 6	20 7 1 26 0		
NINTHPET GPASS COPN SUMFALO NON AGR HATER GRASOFG	84.4 70.7 60.4 72.5 80.0 100.0 51.1 75.6	WINTWPE 707 6 7 30 0	T GRASS12	_ CORN3 3 116	SUMFALC 55 6 9 534 0	23 37 4 39 4 0	9 0 4 16 0 2	9 2 ' 46 73 5 0	20 7 1 26 0 0		
WINTHPET GPASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL ACKKNIFED	84.4 70.7 60.4 72.5 80.0 100.0 51.1 75.6	WINTWHE 707 6 7 30 0 2 1 753 IFICATION NUMBER	T GRASS12147	CORN 3 3 116 13 1 0 17 0 153	SUMFALC 55 6 9 534 0 0 9 5 618	0 NCN AGR 23 37 4 39 4 0 3 1	9 0 4 16 0 2 5 6	9 2 46 73 0 0 45 2	20 7 1 26 0 0 7 25		
LINTHPET GRASS COPN NON AGR HATER GRASOFG RYF OTAL ACKKNIFED	84.4 70.7 60.4 72.5 80.0 151.1 75.6 75.1 CLASSI PERCENT	WINTWHE 707 6 7 30 0 2 1 753 IFICATION NUMBER	T GRASS12147	CORN 3 3 116 13 1 0 17 0 153 CASSIF	SUMFALO 55 6 9 534 0 0 9 5 618	0 NCN AGR 23 37 4 39 4 0 3 0 110	9 0 4 16 0 2 5 0 36	9 2 46 73 6 0 45 2	20 7 1 26 0 7 25 86		
WINTHPET GPASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL JACKKNIFED FOUP	84.4 70.7 60.4 72.5 80.0 100.0 51.1 75.6 75.1 CLASSI PERCENT CORPECT	WINTWHE 707 6 7 30 0 0 2 1 753 FICATION NUMBER WINTWHE 705	T GRASS12	CORN 3 3 116 13 1 0 17 0 153	SUMFALC 55 6 9 534 0 0 9 5 618	0 NCN AGR 23 37 4 39 4 0 3 1	9 0 4 16 0 2 5 6	9 2 46 73 0 0 45 2	20 7 1 26 0 0 7 25		
WINTHPET GPASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL ACKKNIFED FOUP WINTHPET GRASS	60.4 70.7 60.4 72.5 80.0 51.1 75.6 75.1 CLASSI PERCENT CORRECT	WINTWHE 707 6 7 30 0 0 2 1 753 FICATION NUMBER WINTWHE 705	T GRASS12147	CORN 3 3 116 13 1 0 17 0 153 CASSIF	SUMFALO 55 6 9 534 0 0 9 5 618 EED INTO GR	0 NCN AGR 23 37 4 39 4 0 3 0 110	9 0 4 16 0 2 5 0 36	9 2 46 73 6 0 45 2	20 7 1 26 0 7 25 86		
WINTWHET GPASS COPN SUMFALO NON AGR WATER GRASORG RYF OTAL GRACKNIFED WINTWHET GRASS COPN	60.4 70.7 60.4 72.5 80.0 51.1 75.1 CLASS) PERCENT CORRECT	WINTWHE 707 6 7 30 0 0 2 1 753  FICATION NUMBER WINTWHE 765 6	T GRASS12	CORN 3 3 116 13 10 17 0 17 0 153 CLASSIFT CORN 3 3 114	SUMFALO 55 6 9 534 0 0 9 5 618  LED INTO GR	0 NCN AGR 23 37 4 39 4 0 3 0 3 0 110 ROUP -	9 0 4 16 0 2 5 6 36	9 2 46 73 6 0 45 2	20 7 1 26 0 0 7 25 86		
WINTHPET GRASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL ACKKNIFED FOUP WINTHPET GRASS COPN SUMFALO	CORRECT  84.4  70.7  60.4  72.5  80.0  51.1  75.1  CLASS  PERCENT  CORRECT  84.1  59.4  71.9	WINTWHE 707 6 7 30 0 2 1 753 FIGATION NUMBER WINTWHE 705 8 30	T GRASS12	CORN 3 3 116 13 1 0 17 0 153 CASSIF	SUMFALO 55 6 9 534 0 0 9 5 618 EED INTO GR	0 NCN AGR 23 37 4 39 4 0 3 0 110	9 0 4 16 0 2 5 6 36	9 2 46 73 6 0 45 2	20 7 1 26 0 0 7 25 86 87 27 7		
WINTHPET GRASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL ACKKNIFED FOUP WINTHPET GRASS COPN SUMFALO NON AGR	CORRECT  84.4  70.7  60.4  72.5  80.0  51.1  75.1  CLASSI  PERCENT  CORRECT  84.1  79.4  71.9	WINTWHE 707 6 7 30 0 0 2 1 753  FICATION NUMBER WINTWHE 765 6	T GRASS12	CORN 3 3 116 13 10 17 0 17 0 153 CLASSIFT CORN 3 3 114	SUMFALC 55 6 9 534 0 0 9 5 618 EED INTO GR SUMFALC 55 6 9 529	0 NCN AGR 23 37 4 39 4 0 3 0 3 0 110 ROUP -	9 0 4 16 0 2 5 6 36	9 2 46 73 U 6 6 73 U 6 73 U 7 7 7 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9 U 7 9	20 7 1 26 0 7 25 86		
WINTHPET GRASS COPN SUMFALO NON AGR WATER GRASOFG RYF OTAL ACKKNIFED FOUP WINTHPET GRASS COPN SUMFALO NON AGR WATER	CORRECT  84.4  70.7  60.4  72.5  80.0  51.1  75.1  CLASSI  PERCENT  CORRECT  84.1  79.4  71.9  40.0	WINTWHE 707 6 7 30 0 2 1 753 IFICATION NUMBER WINTWHE 705 6 8 30 0	T GRASS 12 147 5 6 0 0 0 170  OF CASES	CORN 3 3 116 17 0 17 0 153 CORN 3 114 114 1 0	SUMFALC 55 6 9 534 0 0 9 5 618 EED INTO GR SUMFALC 55 6 9	NCN AGR 23 37 4 39 4 39 4 110  ROUP -  NCN AGR 23 38 4 40 2 0	9 0 4 16 0 2 5 6 36 WATEP 9 14 16	9 2 46 73 U 0 45 2 47 75 U 0 1	20 7 1 26 0 7 25 86 87 7 27 7 1 26 0		
FOUP  WINTHET  GRASS  COPME  NON AGR  WATER  GRASOFG  RYF  OTAL  ACKKNIFED  FOUP  WINTHET  GRASS  COPME  COPME  WINTHET  GRASS  COMME  COPME  WINTHET  GRASS  COMME  COPME   60.4 70.7 62.5 80.0 100.0 51.1 75.6 75.1 CLASSI PERCENT CORRECT 71.9 40.0 43.2	WINTWHE 707 6 7 30 0 0 2 1 753 IFICATION NUMBER WINTWHE 705 6 8 30 0	T GRASS 12 147 56 0 0 0 170  OF CASES O	CORN 3 3 116 13 1 0 17 0 153 CORN 3 3 114 14 1 1 0 20	SUMFALC 55 6 9 534 0 0 9 5 618 ED INTO GR SUMFALC 55 6 9 529 1	0 NCN AGR 23 37 4 39 4 0 3 0 3 0 110 ROUP -	9 0 4 16 0 2 5 6 36	9 2 46 73 U 0 45 2 45 2 47 75 U 1 3 8	20 7 1 26 0 0 7 25 86 87 27 7 1 26 0 0			
WINTHPET GPASS COPN SUMFALO NON AGR WATER GRASORG RYF OTAL ACKKNIFED WINTHPET GRASS	60.4 70.7 62.5 80.0 100.0 51.1 75.6 75.1 CLASSI PERCENT CORRECT 71.9 40.0 43.2	WINTWHE 707 6 7 30 0 0 2 1 753 IFICATION NUMBER WINTWHE 705 6 8 30 0	T GRASS 12 147 5 6 0 0 0 170  OF CASES	CORN 3 3 116 13 1 0 17 0 153 CORN 3 3 114 14 1 1 0 20	SUMFALC 55 6 9 534 0 0 9 5 618 EED INTO GR SUMFALC 55 6 9	NCN AGR 23 37 4 39 4 39 4 110  ROUP -  NCN AGR 23 38 4 40 2 0	9 0 4 16 0 2 5 6 36 WATEP 9 14 16	9 2 46 73 U 0 45 2 47 75 U 0 1	20 7 1 26 0 7 25 86 87 7 27 7 1 26 0		

STEP	VAR:	AELE	F VALUE TO	NUMBER OF	U-STATISTIC.	APPPOXIMATE
NUMBER	ENTERED	FEMOVED	ENTER OR REMOVE	VARIABLES_INCLUDED		F-STATISTIC
1	11 8403		241.1345	1	0.5538	241.185
2	20 8585		220.4463	<u>s</u>	9.3188	23C+658
3	6 B7D1		192.889)	3	G.2372	18E+193
4	21_B605		81.1829	4	C. 1965	155.822
5	24 SOIL TYP		73.1057	5	0.1498	143.349
6	14		41.0387	6	0.1317	126.222
7 7	3 B491		32.4557	7	0.1188	112.892
δ	9 8602		27.3344	8·	C•1J88	102.387
5	12 P5G3		23.5086	9	0.1739	93.854
16	7 P402		22.2866	10	0.0938	87.615
11	16 8504		16.753 <i>5</i>	11	8889 • 9	80.823
12	4 8531		7.7565	12	0.8866	<u>7</u> 4+660
13	22 E7C5		6,4846	13	0.0347	69.362
14	17_B {D4		6.4223	14	0.0829	64.855
15	15 8404		5.9166	re	G. 0813	60.930
16	8 8502		4.0917	16	0.0302	57.352

	Percento	age of Vario	ation Among	Groups Ex	plained		
Eigenvalues	2.21455	0.80105	0.69378	0.20089	0.04501	0.00880	0.00407
Percentage	55.81	20.19	17.48	5.06	1.13	0.22	0.10
Canonical Ca	orrelations	•				•	
	0.83001	0.66691	0.64000	0.40900	0.20754	0.09339	0.06367

3 2401	0.07157	~C.19867	0.02969	0.00948	0.12384	-0.06057	-0.27496
4 2501	0.02201	0.12676	0.61118	-0.01330	0.01496	-8.00103	3.87194
6 2701	0.63279	0.09934	-0.13391	-0.04929	-0.15434	0.03191	0.01551
7 8402 "	-0.06629	0.05330	9.07812	0.15548	-0.13482	0.14737	-0.22552
8 2502		-0.01220	0.03092	-0.05659	0.13239	-0.20427	0.07173
9 9602	0.09382	-0.06136	0.07686	-0.04959	C+ 64254	0.15 EJ4	0.02982
11 9403	-0.12570	0.05275	8.05218	0.00500	-0.24239	-C.Q5541	-9.26738
12 3503		-0.07 c23	-0.12477	-0.04964	C. 110 E1	0.22070.	0.13731
14 2703	0.15263	-0.01815	-0.01175	-G.C5594	0.10483	-1.35423	0.04298
15 3484	9.00477	C.05758	0.08933	8.67954	8.03054	C • 35 95 5	6.23303
16 9504	-0.00547	-0.04985	-0.08677	-0.04138	0.06813	-0.07316	-0.35554
17 2604	0.00469	-0.03643	-0.01390	0.02750	-C.15116	-0.06836	-0.08448
20 9505	0.04122	-0.15429	0.07657	0.02334	-0.08735	0.02479	0.02100
21 2605	0.03923	G.11963	2.00070	-0.00119	-0.00423	-£. 63 £96	C. C2653
22 8705	-0.07600	0.00726	-0.12133	-0.01362	0.06205	0.14586	-9.04828
24 SOIL TYP	-0.22877	C.21414	0.74557	-1.93160	-0.42896	-0.40442	0.39417
CCRSTANT	-3.49076	5.58173	-1.60270	8.12547	7.15987	0.41393	8.14782
GROUP C	ANCHICAL VAR	TA ELES EVALU	ATES AT GROU	P MEANS			
TSHWT/I/	1.78894	0.10933	-0.16257	0.03294	0.00146	-0.06136_	S.00059
GPASS	-0.93447	1.46395	1.98647	0.14610	-0.07169	0.00348	0.01946
COPN		1.60505	-1.46496	0.09431	0.28686	0.02417_	-9,88529
SUPFALO	-1.06501	-C.97400	C.10656	0.12335	0.04913	0.00294	0.00219
NON AGR	-1.98672	0.66188	0.91388	3.79993	-0.18378	-G.51123	-1.24711
HATER	-0.90238	-C.16215	-0.96194	0.02165	-1.85425	2.81991	-0.50952
GRASORG	-1.60455	0.36809	-1.28270	-0.24520	-0.87851	-0.11181	0.03103
RYE	-0.10102	-C.66145	1.09143	-3.45465	0.13358	0. 30 347	-0.04102

Group	Mean Coordir	nates	Symbol for Cases	Symbol for Mean
Winter wheat	1.79	0.11	Α	1
Grass	-0.93	1.45	В	2
Corn	-1.92	1.61	С	3
Summer fallow	-1.07	-0.97	D	4
Non-agriculture	-1.09	0.66	E	5
Water	-0.90	-0.16	F	6
Grain sorghum	-1.60	0.37	G	7
Rye	-0.10	-0.66	Н	8

CC1-7

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3.6 +	c c c	•
•	C C C C B	•
•	C C B B . 88 8	
•	C CG CC B * *BB C	•
2.7 +	ССССОВВ Н	+
•	C C +CC C DCB B B BB 8 _ A A	
•	CCCCC * *BEEBECB * B B A A A A A A A A A A A A A A A A	•
*	F.CC. C. C. A. B. FC*CC. C*	
1.8 +	A *C C BBCCG* EBBBBB B AA B AC A *AAAAAA	+
•	C CC+CC+3 E+688 B +	•
	C*GCC G E*BBC* B*BB CA AGA*A AA AAAAA*AAA A AA	
- 	C G * G DCC *CE3*BDB* 3B AA* ADA AAADAAA* AA*A AA A	
•90 +	C DCGGC C RE*C*B*BBB*B D * CA AAA*AAAAAAAAAAA AAA AA	+
<u>'</u>	C C G* *G**A5 ABC* A58 C AAAAAAA**A4*AAAAA AAA AA	
	D** *CCC+7* A*** B* D**A*A * H*AAAAA AAAAAAAA A A A	:
•	* GBC*D***D C* *B*8E B D* G A*AAAAA*A*4.44.44AAAAAA A A A	4
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#### APPENDIX D

Saline County LACIE Intensive Study Site

Computer compatible tape coordinates

FR 300 LR 419

FC 160 LC 289

12 Bands of ERTS data from 3 dates:

October 20, 1973

April 18, 1974

July 17, 1974

ERTS observation ID's:

1454-16374 [reference scene]

**1**634-16341

1724-16313

Rotation and distortion parameters for ground truth bands to everly ERTS bands.

+ 16.0° Rotation -

Vertical Stretch 0.1 pel/pel at upper left.

Horizontal Stretch 0.05714 pel/pel at upper left.

Soil types taken from map of Saline County reconnaissance soil conservation survey from Soil Conservation Service, Washington, D. C. 1946.

Crop types were identified from land use data collected by ASCS, June, 1974, prepared by FSO, Cartographic Laboratory Earth Observation Division, S&AD JSC/NASA, Houston, Texas, September 1974

#### APPENDIX DD1

## Discrimination Analysis for SALINE County Using Soil Type

~, <del></del>	BMDF7H - STEP ISE DISCRIMINANT ANALYSIS.
	HEALTH SCIENCES CONFUTING FACILITY
	UNIVERSITY OF CALIFORNIA LOS ANGELES
<u></u>	IN THIS VERSION OF SHEPTM
•	GROUP CODES OF CUTPOINTS MUST BE STATED;
***	
	PROGRAM CONTROL 1' FORMATION
	PROBLEM TITLE = ISALINE CC; SMP 1; FPTS + STF;/
	INPCT PRIT # 12.
	CODE = ISALINE CI,
	COMIENT = 'DATA':
	LARFL = 'SALINE CO SAMPLE 1'4/
	VAPIAB ADD = 0. NAME = IROW, COLUMNI, 184511, 185011, 186011, 187011, 184021,
	1P5021,196021,197021,184031,185031,196031,187031,
<b>1</b>	CROP TYPI, 'SOIL TYPI, 'CROP*SOL',
<b>—</b>	
<u> </u>	GROUPING = 1CROP TYPI:/
	GROUP
<u> </u>	COPF # 1,2,3,5,8,111
Q Q	NAME = 'WINTWHET', 'GPASS', 'CORN', 'NON AG', 'GRANSCRG', 'FOY PE'N', /
	PRINT
	STEP:
	CLASS = 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,/
	PLOT
	GFOUP = 1,2,3,5,8,11;/
-	DISCRIMINANT
	METHOD = 2;
	ENDY
_	
	PROBLEM TITLE : : : : : : : SALINE CO. SMD 1: ERTS + GT
	SUMPER OF VARIABLES TO READ IN
	MINEER OF VARIABLES ADDED BY TRANSFORMATIONS
	TOTAL NUMBER OF VARIAPLES
	NUMBER OF CASES TO READ IN
	CASE LABELING VARIABLES :
	TYPUT UNIT NUMBER
	REMIND INCUT UNIT PRIOR TO PENDING: . DATA YES

	3 p401 8 p502	4 150 9 P60		5 10	56D1 8702			6701 8433	•		8402 8503	
1	3 R6D3	14 F7	3	16	SOIL 1	TYP						
TELFRANCE.	• • • • • •	0,01C 4,090									· · ·	
-TC-RFXQVE.	• • • • •	3,996 2		·								
MAXIMUM FORCED MAXIMUM NUMBER	OF_STEPS	0 34	•								-	
PRIOR PEOBABILI	T1F5,	0,16667	0,16667	0,5	6557	0,1	5667	0,16667	0,10	5667		
_		TRAVSFORMAT							ERVAL			
NO. NAME	FIRIT AINIANE	LIMIT	CODE CODE		NTEGORY ODE	Y CA NA	FEGORY 1E	GREAT THAN	ER		SS THAI EQUAL	
15 CROP TYP			· · · · · · · · · · · · · · · · · · ·		L,05000 L,05000		INTWHET	•			• ;• • •	``_
				3	3,60000	) C	OPN			•		
				ī	:.0000: :0000:	g Gi	RANSORO DY BEAN					
NUMBER OF CAS	FS_FEAT: : :		 		574							
				•				-				

GROUP #	THARTMIR	GRASS	CORV	NON AG	GRANSORG	SCY BEAN	ALL , GI
YATTARLE							
3 B4P1	23.89231	23,86667	22,33333	22,50000	22,93578	21,80952	23,5694
4_B5Pt	21,15355	22:46/67	19:02000	20,900!10	19,26605	17 (38095,	20,64634
5 R6P1	24.10000	26,30000	25,16667	21,50000	22,69725	22,47619	23,89547
<u></u>	11.84872	12:96657	12:33333	10 _8 3 3 3 3	11.13761	10.05714	11,74042
7 P402	31,36462	72,66661	32,00000	31,00000	31,70642	32,19648	31,55749
9 6565	27.64615	29;53335	30.11111	28,166(7	27,80734	30,23610	27,95296
4 B9D5	42,24359	47,33333	37,66667	37,500(0	39,94495	34,00000	41,59931
10 የፖባደ	22,72051	25{53333	19,50000	21,00000	21,00000	17,00000	27,21254
11 941).5	34,63333	35,56667	32,38899 .	33,83333	34,36697	32,42857	34,47213
12,8504	33,93846	<u> </u>	2013 (333	32,00000	33,45424	20,66667	33,64461
13 nens	37.19744	44,96667	36 <b>,</b> 50000	39,16467	37,25688	36,36795	37,56342
14 8703	17,57179	22;00000	17,38889	19,66667	17,53211	17,25571	<u>17</u> 180139
16 SOIL TYP	1,20769	S. 80000	1,11111	1,00000	1,11927	1,00000	1,25132
.15_ CROPTYP	1.000000	2;_00000	3,02000	5.000000	8,000ca	11,00000	
ACCUPATE .	75.		_				
	<u> 39n</u>	<u>30;</u>	18;	5	109.	21;	574;_
STANDARD DE		30;	18;		109.	21;	574;
		GPASS	CORN	NON AG	GRANSORG		
STANDARD DE	vialions	. GPASS				SCY BEAN	
STANDARD DE	vialions						ALIG!
STANDARD DE GROUP &	VIATIONS	. GPASS	CORN 2.89755	NON AG	<u>gr</u> anşorg	SCY BEAN	ALIGF
STANDARD DE GROUP * VARIABLE 3 P4P1	VIATIONS		CORN	NON AG	6RAN50RG	SCY BEAN 1180107	ALIGI 2:9614: 4:5826
STANDARD DE GROUP * VARIABLE 3 P4P1 4 P5P1	VIATIONS	GPASS 2 81294 4 52376	CORN	NON AG 1,3784) 3,52133	GRANŞORG. 2,63268 4,02916	SCY BEAN 1,80107 2,69214	ALI
GROUP & GROUP & VARIABLE 3 P4P1 4 P5P1 5 P6P1	VIATIONS	GPASS 2 81294 4 52376 5 48446	CORN 2:80755 4:91097 3:54665	NON AG 1,3784) 3,52133 2,58844	GRANSORG. 2,63268 4,02916 4,73268	SCY BEAN 1,80407 2,69214 4,35310	ALI
STANDARD DE GROUP *  VARIABLE  3 P4P1  4 P5P1  5 P4P1  6 9701	VIAIICES	GPASS  2 81294 4 52376 5 48445 3 38445 3 34489 5 95230	CORN 2,80755 4,91097 3,54665 2,91043	NON AG 1,37841 3,52133 2,58844 1,72240	GRANSORG 2,63268 4,02916 4,73268 2,73994	SCY BEAN 1,80907 2,69214 2,35310 3,79050	ALI
STANDARD DE  GROUP *  GROUP *  FARIABLE  3 P4P1  4 P5P1  5 P6P1  6 9791  7 P4P2	VIAIICES	GPASS 2 81294 4 52376 5 48445 3 38842 3 31484	CORN 2,80755 4,91097 3,50565 2,91043 3,57823	NON AG 1,3784) 3,52133 2,58844 1,72240 2,0000	GRANSORG 2,63268 4,02916 4,73268 2,73924 3,29225	SCY BEAN 1.80907 2,69214 4,35310 2,79050 3,80288	ALL
GROUP *  GROUP *  GROUP *  ARIABLE  3. 8491  4. 9591  5. 9691  6. 9791  7. 9492  8. 8592  9. 8692  10. 8772	VIATIONS	GPASS  2 81294 4 52376 5 48445 3 38445 3 34489 5 95230	CORN 2,89755 4,91097 3,54665 2,91043 3,57823 6,62339	NON AG 1,37841 3,52133 2,58844 1,72240 2,00000 4,3059;	GRANSORG 2,63268 4,02916 4,73268 2,73104 3,29225 6,46998	5CY BEAN 1,80907 2,69214 6,35310 3,79050 3,80288 6,09020 7,72010 4,97996	ALL
GROUP *  GROUP *  GROUP *  ARIABLE  3. 8491  4. 9591  5. 9691  6. 9791  7. 9492  8. 8592  9. 8692  10. 8772	VIAIICES	GPASS  2 81294 4 52376 5 48445 3 38445 3 34489 5 95230 4 95059	CORN 2,89755 4,91097 3,54665 3,54665 3,54633 6,62339 9,26022	NON AG 1,37841 3,5213-3 2,5884-4 1,72240 2,0000 4,3059: 6,8(34)	GRANSORG 2,63268 4,02916 4,73268 2,73,04 3,29225 6,46998 6,23,908	SCY BEAN 1,80407 2,69214 6,35310 3,79050 3,30288 6,09020 7,72019	ALL 50 2,9614 4,5026 5,37050 3,5020 7,6519 6,7051 5,0306
STANDARD DE  GROUP *  JAR IARLE  3 P4P1  4 P5P1  5 P4P1  6 9791  7 P4P2  P P5P2	VIAIICES	GPASS  2 81,794 4 52376 5 48145 3 34457 5 19230 4 19297 3 49120	CORN  2,80755 4,91097 3,54665 7,91043 3,57823 6,62335 9,26092 5,77148	NON AG  1.37841 3.52133 2.58844 1.72240 2.00000 4.3089: 6.86341 5.72712	GRANSORG 2,63268 4,02916 4,73268 2,73094 3,29225 6,46998 6,29908 4,67856	SCY BEAN  1.89907 2,69214 6.35310 3.79050 3.80288 6.09020 7.72110 4.77684 4.06612	2.9614 4.5826 5.3705 3.7920 7.6515 6.7051 5.03063
STANDARD DE  GROUP *  /ARITABLE  3 8491  4 9591  5 9691  6 9791  7 9492  8 8992  9 8692  10 8772  11 8493	VIAIICES	GPASS  2 81294 4 52376 5 48446 3 31469 5 90230 4 10279 7 10279	CORN  2,80795 4,91097 3,54665 2,91043 3,57823 6,62335 9,26022 5,72145 4,13434	NON AG  1.37841 3.52133 2.58844 1.72840 2.00000 4.3089: 6.80341 5.72712 4.02076	GRANSORG 2,63268 4,02916 4,73268 2,73194 3,29225 6,46998 6,29908 4,67856 3,52152	SCY BEAN  1,89907 2,69214 6,35310 3,59285 6,09020 7,72010 4,77984 4,06612 2,52699	ALL
GROUP *  GROUP *  GROUP *  /ARIARLE 3 P4P1 4 P5P1 5 P6P1 6 9791 7 P4P2 P P5P2 10 P4P2 11 P4P3 12 B5P3	VIATIONS  WINTWHET  3,12362  4,60059  6,84790  3,29939  3,69127  6,19574  6,8169  3,54282  6,26381	GPASS  2 81294 4 52376 5 48446 3 38445 3 31489 5 99230 4 149120 3 19275 5 99080	CORN 2:80755 4:91097 3:54665 2:91043 3:57823 6:62339 9:26022 5:76248 4:13434 7:43600	NON AG  1:3784: 3:52135 2:58844 1:7224: 2:00:00: 4:3089: 6:8034: 5:7212 4:02076 4:12404	GRANSORG 2,63268 4,02916 4,73268 2,73094 3,29225 6,46998 6,27908 4,57152 6,62352	SCY BEAN  1,80407 2,69214 6,35310 3,79350 3,90263 6,09020 7,72010 4,97996 1,77684	ALL GF 2:96148 4:534653 3:249205 7:65198 6:76515 5:03063 3:59543 6:31425 5:06168

VARIABLE	F TO FOR	CE +	VARIABLE	F TO	FORCE	TOLEPANCE	
EFIXERUBE.	REMOVE LEV		*004406E	ENTER	LEVEL		
ים	F= 5 567	` # # *		DF= 5 566			
9 BAD2	10,836 1	. *	3 84Di	1,380	1	0.796529	
16 SOIL TYP	61,876	•	4 F501	1:461	<u>i</u>	0.745217	
		4	5 06D1	1,529	1	0,931492	
· <del>·</del>		Φ	6_E7D1		1	<u> </u>	·····
		. •	7 B4D2	0,313	1	0,952570	
	<del> </del>	*	8 <u>5552</u>	0,519		<u> </u>	
		4	10 87D2 11 84D3	0,186 2,110	1	0,126949 0,978914	
		*	12 8553	2:303	<del>_</del>	0,946325	<del> </del>
		4	13 66 <u>03</u>	2,332	1	0,956874	
		<del></del>			<u>-</u>		
	_	ě.	14 B7D3	21564	1	0.9635/5	
•	. •	4	14 B7D3	2;564	1	0,963575	
J-STATISTIC OR	VILKET LAMPO			2;564 EES OF FREE!	1 00M 2		
			77 DESF				
J-STATISTIC OR	STATISTIC	0 56110 35:3	77 DESF	EES OF FREE!		5 568	
	STATISTIC	)A 0,56110	77 DESF	EES OF FREE!		5 568	
F = MAIRIX	STATISTIC PEGREES	0,56110 35;3 OF FREEDON	77 DE96 69 DEG6	EES OF FREE!		5 568	
F = KAIRIX	STATISTIC  DEGREES WINTER GRAS	0,56110 35;3 OF FREEDOM	77 DESF	EES OF FREE!		5 568	
F = RATRIX  GRASS 157	STATISTIC  DEGREES WINTUM CRAS	0,56110 35;3 OF FREEDON	77 DE96 69 DE96	EES OF FREE!		5 568	
F = KATRIX  GPASS 157  CCRU 4	DEGREES WINTUH GRAS 171 127 1914	0,56110 35;3 <u>of freedom</u> SS <u>coru</u>	77 DE96 69 DE96	EES OF FREE!		5 568	
F = KATRIX  GPASS 157  CCRU 4  HOW AG 1	#INTUH GRAS  • 71 • 27 • 79,74 • 13 • 37,76	0,56110 35;3 OF FREEDON	77 DEGF 569 DEGF = 2 567 NOV AG	EES OF FREEI FES OF FREEI GFANSO		5 568	
F = KATRIX  GPASS 157  CCRU 4  hOW AG 1  GRANCO 6	#INTUH GRAS  • 71 • 27 • 79,74 • 13 • 37,76	0,56110 35;3 0F FREEDOH SS COR!!	77 DE96 69 DE96	EES OF FREE!		5 568	
GPASS 157 CCRU 4 HOW AG 1 GRANCO 6 SOY RE 16	EEGREES WINTUM GRAS .71 .27 79.74 .13 37.76 .34 155.19 .50 109.25	0,56110 35;3 0F FREEDOH SS CORU	77 DESF 60 DESF = 2 560 NON AG	EES OF FREEI FES OF FREEI GFANSO		5 568	
F = KATRIX  GPASS 157  CCRU 4  HOW AG 1  GRANCO 6	EEGREES  WINTUM GRAS  .71 .27	0,56110 35;3 0F FREEDOH SS CORU	77 DESF 60 DESF = 2 560 NON AG	EES OF FREEI FES OF FREEI GFANSO	004	5 568	G O
GPASS 157 CCRU 4 how as 1 GRANCO 6 SOY RE 16	EEGREES  WINTUM GRAS  .71 .27	0,56110 35;3 0F FREEDOM SS CORP 0:20 0:20 0:87 1,60	77 DEGF 60 DEGF = 2 560 NON AG 0,10 1,53	GFANSO  7,31	004	5 568 10,60 1134,	

GROLP	- PERCENT - SORRECI	NUMPER (	OF CASES	CLASSIFIED	INTO GRO	OP -	
	2 2 44 112 1111	MINIMHE.	TGRASS	CCRN	HON AG	GRANSORG	SOY BEAN
LAINTHHET	52.6.	206	22	22	68		72
GFASS	90,0	3	27	0 .	0	0	G
CCon	11:1	6	1	2	Ó	0	9 .
NOT AG	16,7	2	0	ŋ	5.	0 .	3 ,
_GR# 4898@		46	1	5	24	<u>`</u>	33
SOY DEAN	71,4	5	Q	ū	1	0	15
TOTAL	43,7	268	51	29	94	0	132
JACKKI ITE	D CLASSIF	ICATION			+		<del></del>
GROUP	PERCENT CORNECT	NUMBER (	OF CASES	CLASSIFIED	INTO GRO	UP -	
		FARMINIM	T GRASS	Севи	NON AG	GRANSORG	SOY BEAN
WINTLUFT	52.6	205	23	22	58	C	72
GP/SS	90,0	3	27	ŋ	D	0	0
COBM	11 1	6	<u> </u>	22	<u>.</u>	0	9
አርም ልብ	Ο,	2	ŋ	G	0	1	3
_GRAMSORG		46	1	5	24		33
SOY FEAN	71.4	5	A	n	4	n	15

STEP	VARI	ABLE	F VALUE TO	NU 1BER OF	U-STATISTIC	APPROXIMATE
KÜRFER	ENTERED	PEMOVED	ENTEP OR PEMOVE	VARIABLES INCLUDED		F-STATISTIC
1	16 SOIL TYP		64.8373	1	0,6366	64.837
2	9 8602		10.8365	2	0.5811	35,360

### Percent of Variation Between Groups Explained

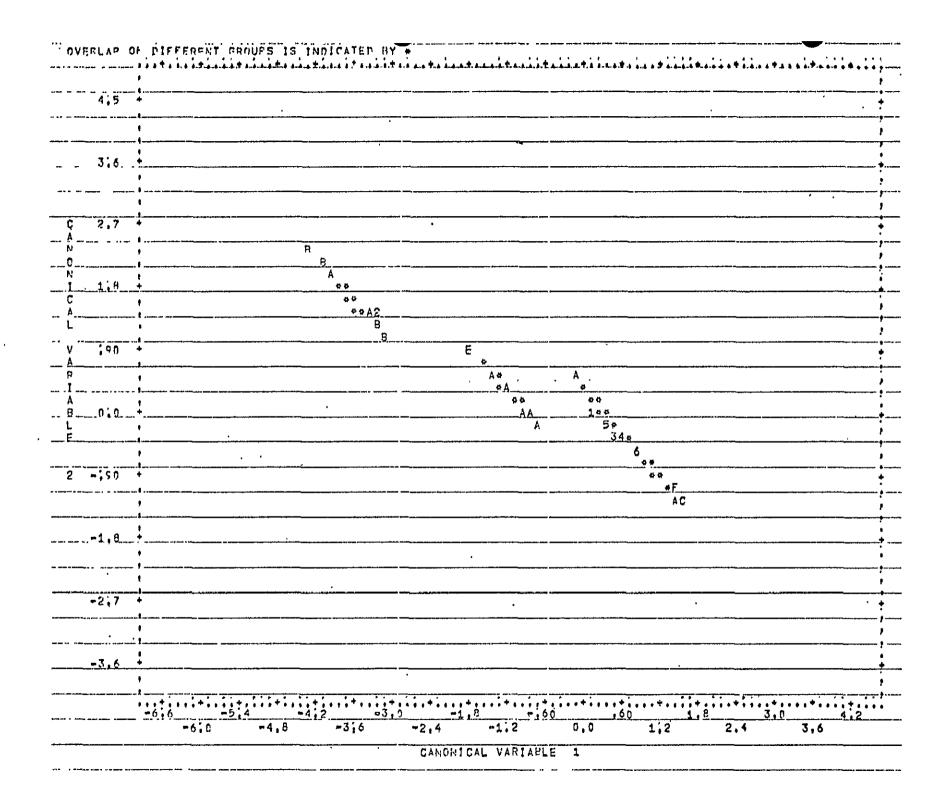
0.22286

Eigenvalues 0.63539 0.05226
Percentage 92.40 7.60
Canonical Correlations

0.62332

VARIAPLE	_ waterioreins	FOR CANONICAL VARIABLES
9 8602	-0.04907	
16 SOIL TYP	-1,94661	0,78942
CONSTANT	4,49658	-3;n3538 ·
GROUP	CAMONICAL VAR	TABLES EVALUATED AT GROUP MEA
WINTWHET	<u>0,07279</u>	<u> •0.20931</u>
GRASS	-3,27653	1,49041
15.00	1.4853P	-0.315PE
YOM AG	0,41171	=0.30997
GRAMSORG	0.35771	-0.19442
SOY BEAN	0.88159	±0,58775

GROUP	Mean Coordin	ıates	Symbol for Cases	Symbol for Mean
Winter wheat	0.07	-0.01	Α	1
Grass	-3.28	1.49	В	2
Corn	0.49	-0.32	С	3
Non-agriculture	0.61	-0.31	D	4
Grain sorghum	0.36	-0.19	E	5
Soybeam	0.86	-0.59	F	6





#### APPENDIX DD2

## Discriminant Analysis of SALINE County Without Using Soil Type

,	BrupyM - STEPHISE DISCRIPINANT 4NALYSIS.
	HEALTH SCIENCES COMPUTING FACILITY
•	UNIVERSITY OF CALIFORNIA. LOS ANGELES
-	IN THIS VERSION OF BYOPTH
	GROUP COSES OR CUTPCINTS MUST BE STATED.
-	PROGRAM CONTROL INFORMATION
	PROBLEM TITLE = "SALINE CO. SMP 1. ERTS + GT"./
•	INPUT
_	UNIT = 12.
	CCCE = "SALINE C".
	CGNTENT = "DATA".
	LAEEL = 'SALINE CO SAMPLE 1'./
	VARIAB ADD = C.  NAME = 'ROW', "COLUMN', "B4D1", "B5D1", "B6D1", "B7D1", "B4D2",
	"8502", "8602", "8702", "8403", "8503", "8603", "8703",
•	'CROP TYP', 'SOIL TYP', 'CROP*SOL'.
Ÿ	USE = 3,4,5,6,7,8,9,10,11,12,13,14.
•	LABEL = 1,2.
ġ.	GROUPING = 'CFCP TYP'./
<u> </u>	GROUP
<u>.</u>	CODE = 1,2,3,5,8,11
Ş	*GRANSORG*, *SOY BEAN*./
•	PRINT - GRANSONG - SUI CEAN -/
	STEP.
	CLASS = 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15./
	PLOT
	CAPONICAL.
	GRCUP = 1,2,3,5,8,11./
	DISCRIMINANTMETHOD = 2
	ICCUPATES /
	- EVON
_ `	
	PPOBLEH TITLE SALINE CO. SMP 1. ERTS + GT
ͺ,	NUMBER OF VARIABLES TO READ IN
	NUMBER OF VARIABLES TO READ IN
	TOTAL NUMBER OF VARIABLES
	NUMBER OF CASES TO PEAD IN
	CASE LADELING VAPIABLES CCLUHN
	LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS
	INFUT UNIT NUMBER
	REWIND INPUT UNIT PRIOR TO READING DATA YES YES

•	3 8401	4 8	3501	5	B601		6	870i		7 8402
- •	8 <u>8502</u>	9 [	3602	10	87 C 2		11	9403	1	2 8503
	13 8603	14	3763				•			
TCLEPANGE		0.010								<del></del>
F-TO-ENTER		4.000								
F-TO-REMOVE	The second secon	3.996								
METHOD			2							
HAXIMUP FORCED		!	3			_				
PIXIMUP NUMBER										
PFIOR PROBABIL	ITIES	0.16667	7 0.16667	0.	16667	0.166	67	0.16667	0.16	667
	BEFORE	TRANSFORI	ATION	,				INT	ERVAL	RANGE
<u>VARIAELE</u>	MINIMUM	MUMIXAM	MISSING	<u> </u>	ATEGORY	CATE	GO-2Y	GREAT	ER	LESS THAN
BMAN .O4	LIHIT	FIRIT	CODE	· c	300E	MAME	:	THAN		OR EQUAL T
15 CROP TYP	1			<del></del>	1.00000	WI	ITWHET			
					2.00000	GR:	SS			
•					3.00000	303	: N		_	
					<u>5.90000</u>	10и	I AG			
			-		8.00000	GRA	NSORG			
<del></del>				1	1.03000	S01	<u> BEAN</u>	<u> </u>		
LINDED AF FI	SES READ				574					

GROUP =	MINTWHET	GRASS	. CORN	NON AG	GRANSORG	SOY BEAN	ALL GP
/APIAGLE						0 4 14 3 4 A B A A B B	
3 84C1	23.89231	23.86557	22.33333	22.50000	22.93578	21.80952	23.56969
4 85 D 1	21.15385	22•46667	T8.6000B	50• 60 00 0	19.26605	17.38095	20.64634
5 8601	24-10000	26.30000	25.16667	21.50000	22.69725	22.47619	23.89547
_ 6 B7C1	11-84872	12.96667	12.33333	10.83333	11.13761	10.85714	11.74042
7 B402	31.38462	32.66667	32.00000	31.00030	31.70642	32.19048	31.55749
8 E5CZ	27.64615	29.53333	3( •111111	28.16667	27.80734	39.23310	27.9529
9 8602	42.24359	47.33333	37.66667	39.50000	39.94495	34.00000	41.59930
10 8702	22.72051	25.53333	19.50100	21.00000	21.00000	17.00000	22.21254
11 B4C3	34.63333	35.56657	32.38889	33.83333	34.36697	32.42857	34.47213
12_8503	33 93 246	36.23000	30 • 33 333	<u>32.00000</u>	33.48624	28.65657	33.64460
13 8603	37.19744	44.96667	36.50000	39.16667	37.25668	36.38095	37.58362
14 B703	17.57179	22.00000	17,38889	19.66667	17.53211	17.28571	17.60139
15 CFOP TYP	1.00000	2.00000	3.00000	5.00000	8.00000	11.00000	2.85192
DUNTS	390.	30.	18.	6.	109.	21.	574.
			-				
STANDARD DE	VIATIONS						
	V JATIONS WINTWHET	GRASS	CORN	NON AG	GRA KSOKG	SOY BEAN	ALL GP
GRÔÛP ∓,			CORN	NON AG	GRA ÑSÓKG	SOY BEAN	ALL GP
GROUP # ARIABLE			CORN 2 • 8 0 75 5	NON AG 1.37840	2. 63268	SOY BEAN 1.80607	
GRÔUP =	WÎNTWHET	GRASS					2.96168
GROUP # ARIABLE	#INTWHET 3.12362	GRASS 2.81294 4.52376 5.49446	2 • 8 0 755 4 • 91 0 9 7 3 • 56 8 65	1.37840	2. 63268	1.80607	2.96168
GROUP = . ARIAGLE	WINTWHET 3.12362 4.80059	GRASS 2.81294 4.52376 5.49446	2 • 8 0 755 4 • 91 0 9 7 3 • 56 8 65	1.37840 3.52136	2.63268 4.02916	1.80607 2.69214	2.96168 4.58267 5.36053
GROUP # ARIAGLE 3 0401 4 05[1 5 8601	3.12362 4.80059 5.54790	GRASS 2.81294 4.52376	2 • 8 0 755 4 • 91 0 9 7 3 • 56 8 65	1.37840 3.52136 2.58844	2. 63268 4.02916 4.73268	1.80607 2.69214 6.35310	2.96168 4.58267 5.36053 3.20029
GROUP # ARIABLE 3 0401 4 05[1 5 8601 6 67[1 7 8402	3.12362 4.80059 5.54790 3.29833	GRASS  2 · 81294 4 · 52376 5 · 49446 7 · 38845	2.80755 4.91097 3.56865 2.91043	1.37840 3.52136 2.58844 1.72240	2. 63268 4.02916 4.73268 2.73004	1.80607 2.69214 6.35310 3.79350	2.96168 4.58267 5.36053 3.20029 3.59205
GROUP # ARIAGLE 3 0401 4 05[1 5 8601 6 67[1	3.12362 4.80059 5.54790 3.29839 3.69127	GRASS  2.81294 4.52376 5.49446 7.38845 3.31489	2.80755 4.91097 3.56865 2.91043 3.67823	1.37840 3.52136 2.58844 1.72240 2.00000	2. 63268 4.02916 4.73268 2.73004 3.29225	1.80607 2.69214 6.35310 3.79350 3.80288	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198
GROUP # ARIABLE 3 0401 4 0501 5 8601 6 6701 7 0402 9 8502	3.12362 4.80059 5.54790 3.29839 3.69127 8.19574	GRASS  2.81294 4.52376 5.49446 7.38845 3.31489 5.95230	2.80755 4.91097 3.56865 2.91043 3.67823 6.62339	1.37840 3.52136 2.58844 1.72240 2.00000 4.30891	2. 63268 4.02916 4.73268 2.73004 3.29225 6.46998	1.80607 2.69214 6.35310 3.79350 3.80288 6.09020	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198
GROUP #  ARIAGLE 3 0401 4 0501 5 8601 6 6701 7 0402 9 8502 9 8602 10 0702	3.12362 4.80059 5.54790 3.29833 3.69127 8.19574 6.85169 5.18068	GRASS  2.81294 4.52376 5.49446 7.38845 3.31489 5.95230 4.46699	2.80755 4.91097 3.56865 2.91043 3.67823 6.62339 9.26092 5.72148	1.37840 3.52136 2.58844 1.72240 2.00000 4.30891 6.60341 5.72713	2. 63268 4.02916 4.73268 2.73004 3.29225 6.46998 6.28908 4.67856	1.80607 2.69214 6.35310 3.79350 3.80288 6.09020 7.72010 4.97996	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198 6.78515
GROUP =  ARIABLE  3 8401  4 05 [1  5 86 01  6 67 01  7 84 02  9 85 02  10 87 02  11 84 03	3.12362 4.80059 5.54790 3.29833 3.69127 8.19574 6.85169 5.18068 3.54282	GRASS  2.81294 4.52376 5.49446 7.39445 3.31489 5.95230 4.46699 3.49120	2.80755 4.91097 3.56865 2.91043 3.67823 6.62339 9.26092 5.72148 4.43434	1.37840 3.52136 2.58844 1.72240 2.00000 4.30891 6.60341	2. 63268 4.02916 4.73268 2.73004 3.29225 6.46998 6.28908	1.80607 2.69214 6.35310 3.79350 3.80288 6.09020 7.72010	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198
GROUP =  GRO	3.12362 4.80059 5.54790 3.29833 3.69127 8.19574 6.85169 5.18068	GRASS  2.81294 4.52376 5.49446 7.38845 3.31489 5.95230 4.46699 3.49120 3.10376 5.99080	2.80755 4.91097 3.56865 2.91043 3.67823 6.62339 9.26092 5.72148 4.43434 7.43600	1.37840 3.52136 2.58844 1.72240 2.00000 4.30891 6.60341 5.72713 4.02678	2. 63268 4.02916 4.73268 2.73004 3.29225 6.46998 6.28908 4.67856 3.52152	1.80607 2.69214 6.35310 3.79350 3.80288 6.09020 7.72010 4.97996	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198 6.78515 5.03063 3.50541 6.31470
GROUP =  ARIABLE  3 8401  4 05 [1  5 86 01  6 67 01  7 84 02  9 85 02  10 87 02  11 84 03	#INTWHET  3.12362 4.80059 5.54790 3.29833 3.69127 6.85169 5.18068 3.54282 6.26381	GRASS  2.81294 4.52376 5.49446 7.38845 3.31489 5.95230 4.46699 3.49120 3.10376 5.99080	2.80755 4.91097 3.56865 2.91043 3.67823 6.62339 9.26092 5.72148 4.43434	1.37840 3.52136 2.58844 1.72240 2.00000 4.30891 6.80341 5.72713 4.02678	2. 63268 4.02916 4.73268 2.73004 3.29225 6.46993 6.28908 4.67856 3.52152 6.62852	1.80607 2.69214 6.35310 3.79350 3.80288 6.09020 7.72010 4.97996 1.77684 4.06612	2.96168 4.58267 5.36053 3.20029 3.59205 7.65198 6.78515 5.03063

								*** *** ***	
. VARIABLE		F TO	FORCE	<del></del>	VARLABLE			TOLERANCE_	
		REMOVE		*		ENTER			
a a		5 _ 568		<del>-</del>		DF= 5 56 1.540		0.796530	
9 8602		12.877	1		3 84D1 4 85C1	1.445		0.745644	
<del></del>	<u> </u>			*	5 86D1	1.639		0.931699	
				*	5 8701	1.135	_	0.966690	
				*	- 7 84C2	1.534		0.958241	
				*	8 B502	1.450		0.924713	
				*	18 B702	0.909		0.127640	
				#	11 B4G3	1,931		0.980465	
				*	12 85D3	2.076	1	0.948222	
				*	13 8603	3.052	1_	0.958965	
				4	14 B703	3.348	1	0.963748	
• •									
Ĵ-statīstī	C OF WI	LKа LĀ	MECA			REES OF FREE		1 5 568	3
								1 5 568 5.00 568	
						REES OF FREE REES OF FREE			
<u> YEPROXIMAI</u>	E F-STA	TISTIC_		12.8	77 DEC	REES OF FREE			
IPPROXIMAT	E F-STA	TISTIC_		12.8		REES OF FREE			
F - MATRI	E F-STA	TISTIC DEGRE	ES OF	12.8	77 DEC	REES OF FREE			
IPPROXIMAT	E F-STA X hIN 15.66	TISTIC DEGRE	ES OF	12.8	77 DEC	REES OF FREE			
F + MATRI GRASS CORN	E F-STA  X  hIN  15.66  7.83	TISTIC  DEGRE TWH G	ES OF RASS 83	12.8 FREEDOM CORN	77 DEC	REES OF FREE			
F - MATRI GRASS CORN NON AG	E F-STA X hIN 15.68 7.83 0.97	TISTIC DEGRE TWH G 22.	ES OF RASS 83 66	12.8 FREEDOM CORN 0.33	77 DE( = 1 50 NON AG	REES OF FREE			
F + MATKI GRASS CORN NON AG GRANSO	E F-STA X hIN 15.68 7.83 0.97 9.78	DEGRE TWH G 22. 6. 27:	ES OF RASS 83 66 89	12.8 FREEDOM CORN 0.33 1.74	77 DE( = 1 50 NON AG  0.02	GREES OF FREE		5.00 568.	
F + MATRI GRASS CORN NON AG	E F-STA X hIN 15.68 7.83 0.97	DEGRE TWH G 22. 6. 27:	ES OF RASS 83 66	12.8 FREEDOM CORN 0.33	77 DE( = 1 50 NON AG	REES OF FREE		5.00 568.	
GRASS CORN NON AG GRANSO	E F-STA X 15.68 7.83 0.97 9.78 29.41	DEGRE TWH G 22. 6. 27: 47.	ES OF RASS 83 66 86 70.	12.8 FREEDOM CORN 0.33 1.74	77 DE( = 1 50 NON AG  0.02	GREES OF FREE		5.00 568.	
GRASS GRASS CORN NON AG GRANSO SOY BE	E F-STA X 15.68 7.83 0.97 9.78 29.41 TION FU	DEGRE THH G 22. E. 27. 47.	ES OF RASS 83 66 89	12.8 FREEDOM CORN 0.33 1.74 2.83	77 DE( = 1 56 NON AG 0.02 3.07	GREES OF FREE	DOM	5.00 568.	. 00
GRASS CORN NON AG GRASS SOY BE CLASSIFICA	E F-STA X 15.68 7.83 0.97 9.78 29.41	DEGRE THH G 22. E. 27. 47.	ES OF RASS 83 66 89	12.8 FREEDOM CORN 0.33 1.74	77 DE( = 1 50 NON AG  0.02	GREES OF FREE		5.00 568.	
GRASS GRASS CORN NON AG GRANSO SOY BE	E F-STA X 15.68 7.83 0.97 9.78 29.41 TION FU	DEGRE THH G 22. E. 27. 47.	ES OF RASS 83 66 89 70	12.8 FREEDOM CORN 0.33 1.74 2.83	77 DE(  = 1 56  NON AG  0.02  3.07  CORI	GREES OF FREE  GRANSO  13.52  N NON	DOM	5.00 568.	. 00

SROUP	PERCENT CORRECT	NUMBE	R OF CASES	CLASSIFI	ED INTO GR	DLP -	
	<u>cot vecit</u>	WINTW	HET GFASS	CORN	NON AG	GRANS	GRG SOY BEAN
MINTRHET	20.0	-		34	12	27	74
CRASS	76.7	5	23		0	8	
CORN	11.1	ż	5	2	Ġ	Ĉ	9
NON AG		<u> </u>	2	0	0	<u> </u>	3
GRANSCRG	11.9	25	ΣĒ	12	ž	13	31
SOY BEAN		3	3	0	0	3	15
TCTAL	22.8	114	224	50	14	4.0	132
JĄCKKNIFE	D CLASSIF	ICATION		·	•		
GROUP	PEPCENT	NÜMBE	R OF CASES	CLASSIFI	D INTO GR	OUP -	
	CORRECT						
<del></del>	_CORRECT_	WINTW	HET GRASS	CORN	NON AG	GRANS	ORG SOY BEAN
 		WINTW 78	HET GRASS 165	CORN 34	NON AG 12	GRANS 27	ORG SOY BEAN
<del></del>							
	20• <u>0</u>	78	165	34	12	27	74
	20. <u>0</u> 76.7	78 5	165 23 ·	34 2	12 0	27 1)	0
WINTERET GRASS CORN	20.0 76.7 11.1	78 5	165 23 · 5 2	34 2 2	12 0 0	27 0 0	74 0 9
WINTHET GRASS CORN NON AG	20.0 76.7 11.1 0.	78 5 2	165 23 · 5	34 2 2 0	12 0 9	27 0 0	74 0 9 3

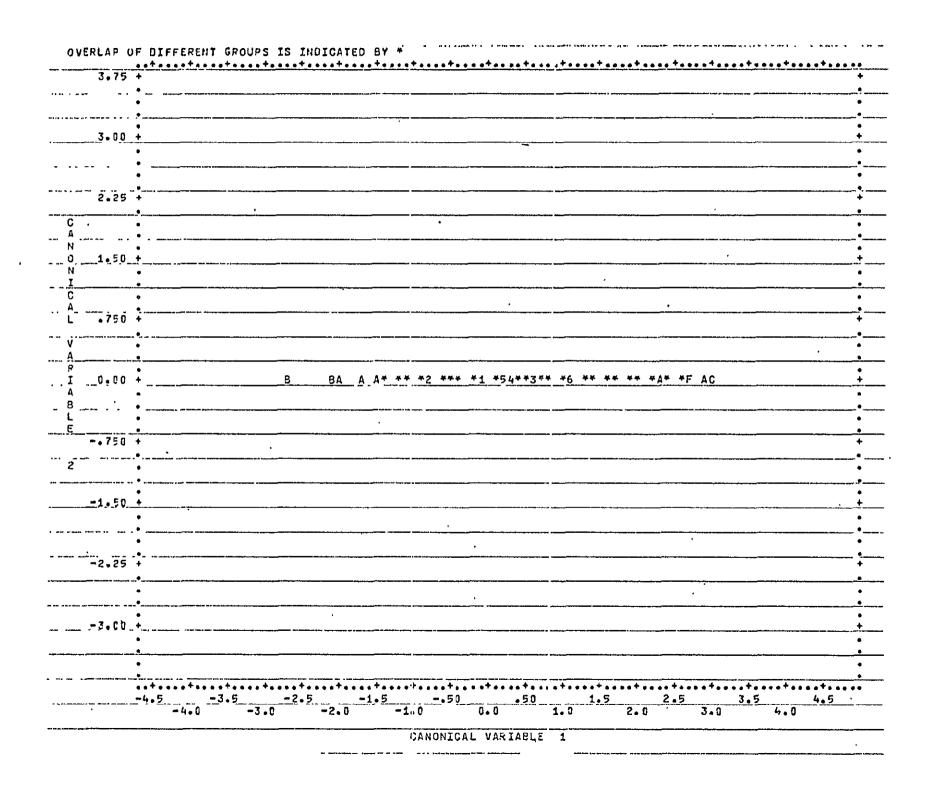
UNFARY TAB		F VALUE TO	NUMBER OF	U-STATISTIC	APPROXIMAT
STEF	VARIAELE ENTERED REMOVED	ENTER CR REMOVE		0.8982	F-STATISTIC 12.877
NUMEER 1	9 BED2	12.8769	<b>3.</b>	ñ • 9305	

### Percentage of Variation Between Groups Explained

Eigenvalues	0,11335	0.0
Percentage	100.0	0.0
Canonical Correlations	•	
-	-0.31908	0.0

*	-	
VARTABLE	COEFFICIENTS	FCP CANONICAL VARIABLES
9_86.C2	-0.14738	. 0.0000
CCNSTANT	5.13094	-0.00000
GROUP	CANONICAL VAC	TACLES CHALDATED AT SDOUG MEENS
		TAELES EVALUATED AT GROUP MEANS
WINTHHET	-J.09495	0.0000
WINTHHET GFASS	-0.09496 -0.64509	0.00000 0.00000
WINTHHET	-J.09495	0.00000 0.00000
WINTHHET GFASS CCRN	-0.09456 -0.64509 0.57960	0.00000 

GROUP	Mean Coordi	nates	Symbols for Cases	Symbols for Means
Winter wheat	-0.09	0.0	A	1
Grass	-0.85	0.0	В	2
Corn	0.58	0.0	С	3
Non-agriculture	0.31	0.0	D .	4
Grain sorghum	0.24	0.0	E	5
Soybeam	1.12	0.0	F	6



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	-4.5 <u>-3.5 -2.5 -1.550 .50 1.5 2.5 3.5 4.5</u>
	-4.0 -3.0 -2.6 -1.0 0.0 1.C 2.0 3.0 4.0

#### APPENDIX E

Finney County LACIE Intensive Study Site
Computer compatible tape coordinates

FR 255

LR 400

FC 180

LC 395

20 Bands of ERTS data from 5 dates:

ERTS Observation ID's	Date		
1456-16551		Oct. 23, 1973	
1636-16460		Арг. 20, 1974	
1654-16453	-	May 8, 1974	
1672-16450		May 26, 1974	
1708-16435		July 1, 1974	

Rotation and distortion parameters for ground truth bands to overlay ERTS bands.

- + 16.2° Rotation
- .116 pel/pel vertical stretch at upper left
- .05714 pel/pel horizontal stretch at upper left

Soil types taken from map of Finney County reconnaissance soil conservation survey from Soil Conservation Service, Washington, D. C. 1947.

Crop types were identified from landuse data collected by ASCS, June, 1974, prepared by FSO, Cartographic Laboratory Earth Observation Division, S & AD JSC/NASA, Houston, Texas, September, 1974.

#### APPENDIX F

### Ellis County LACIE Intensive Study Site Computer compatible tape coordinates

#### 20 Bands of ERTS data from 4 dates:

ERTS Observation ID's	Dates
1455-16432	Oct. 21, 1973
1689-16382	Mar. 24, 1974
1672-16444	May 26, 1974
1726-16425	July 19, 1974

Rotation and distortion parameters for ground truth bands to overlay ERTS bands.

Soil types taken from map of Ellis County reconnaissance soil conservation survey from Soil Conservation Service, Washington, D. C. 1947.

Crop types were identified from landuse data collected by ASCS, June, 1974, prepared by FSO, Cartographic Laboratory Earth Observation Division, S & AD JSC/NASA, Houston, Texas, September, 1974.